



EU-Commission

JRC Contribution to EVE IWG:

In-vehicle battery durability

57th meeting of the GRPE Informal Working Group
Electric Vehicles and the Environment (EVE)

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Presentation Summary

Follow-up of the JRC activities in support to EVE IWG “in-vehicle battery durability” topic

What's new:

- Exploring and integrating new cell chemistry models into JRC TEMA
- Exploring a simplified battery thermal model as follow up NRC exchanges
- Exploring commercial vehicles performance requirements on new set of driving data and recharge strategies

Implementation of the performance based models into JRC TEMA: vehicle architecture

Vehicle Electric Architectures (examples)

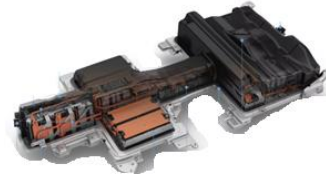
e-Van 1



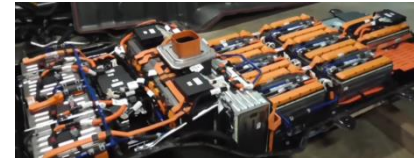
e-Van 2



e-Van 3



e-Van 4



	Vehicle Type	Weight [kg]	Payload [kg]	Battery Size [Wh]	Battery Shape	No. of Cells [#]	Reference Voltage [V]	Usable Energy at BoL [Wh]	Usable Energy at EoL [Wh]	Reserve [% of battery capacity]	Energy consumption [Wh/km]
Mid-sized e-Van	BEV 1	1,597	658	40,000	Parallelepiped	192	350	30,000	24,000	15%	200
Mid-sized e-Van	BEV 2	1,560	605	33,000	Parallelepiped	96	370	24,750	19,800	15%	194
Large-sized e-Van	BEV 3	2,502	998	35,800	Parallelepiped	264	321	26,850	21,480	15%	215
Mid-sized e-Van	BEV 4	2,440	1,060	47,000	Parallelepiped	180	389	35,250	28,200	15%	314

Implementation of the performance based models into JRC TEMA: vehicle architecture

- 3 new recharge strategies defined for a total of 19 ones available in TEMA :

- ✓ Str. 17 = Short stop DC with SOC and trip length control (SOC <30% or trip length > 40km)
- ✓ Str. 18 = lunch break DC (more than 20 minutes)
- ✓ Str. 19 = lunch break DC and Night-charging AC
- ✓ Already available Str. 16 = Return “home/depot” recharging AC

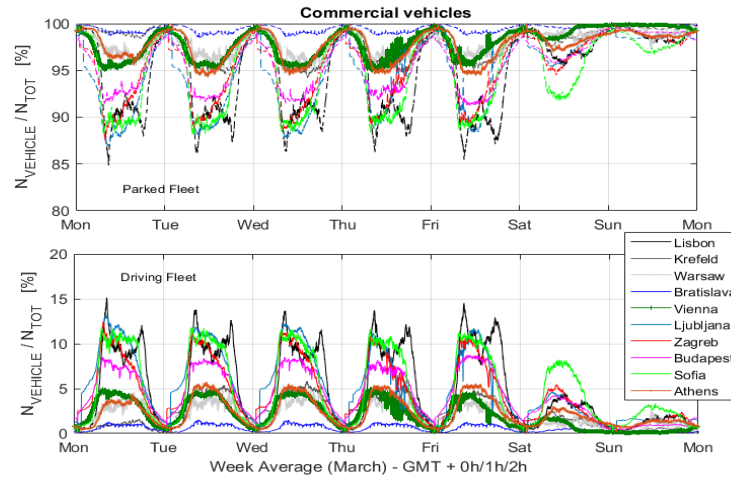
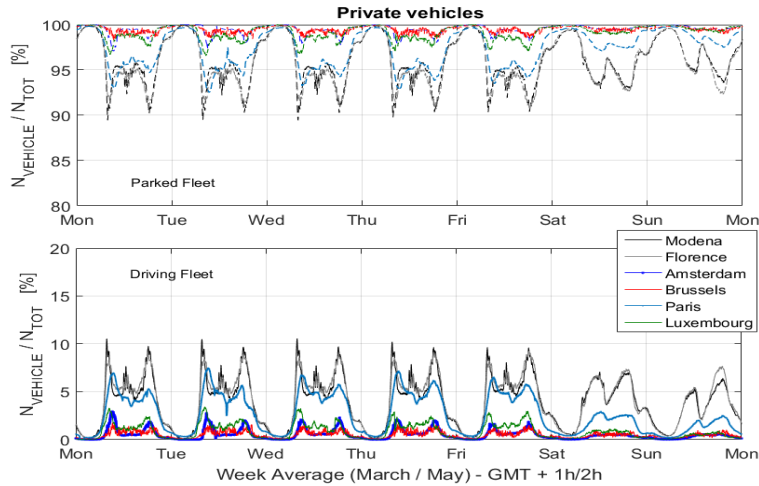
- Analyses done for:

- Str. 6 = Long Stop Random AC;
- Str. 7 = Short-Stop Random DC;
- Str. 8 = Night AC from 10 p.m.; Str.12 Night Ac from 6 p.m.
- Str. 11 = Smart AC;
- Str. 9 = Long-Stop AC 3-phases;
- Str. 16, Str.17, Str. 18 and Str. 19

- Calendar and cycle ageing are assumed independent terms to the total capacity fade
- The capacity fade is calculated at the net of the capacity fade reserve. i.e.:

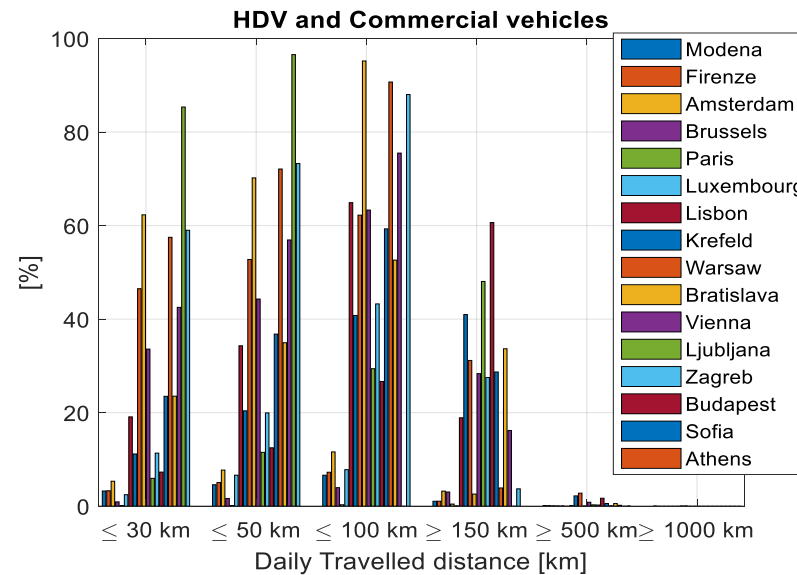
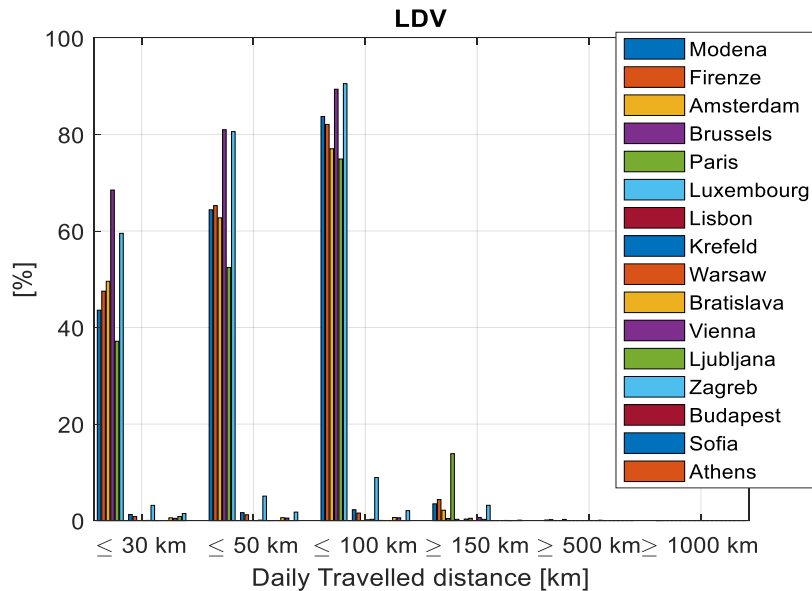
$$Q_{\text{loss}_{\text{total}}} = Q_{\text{loss}_{\text{calendar}}} + Q_{\text{loss}_{\text{cycle}}} - \text{Reserve}$$

Mobility analysis

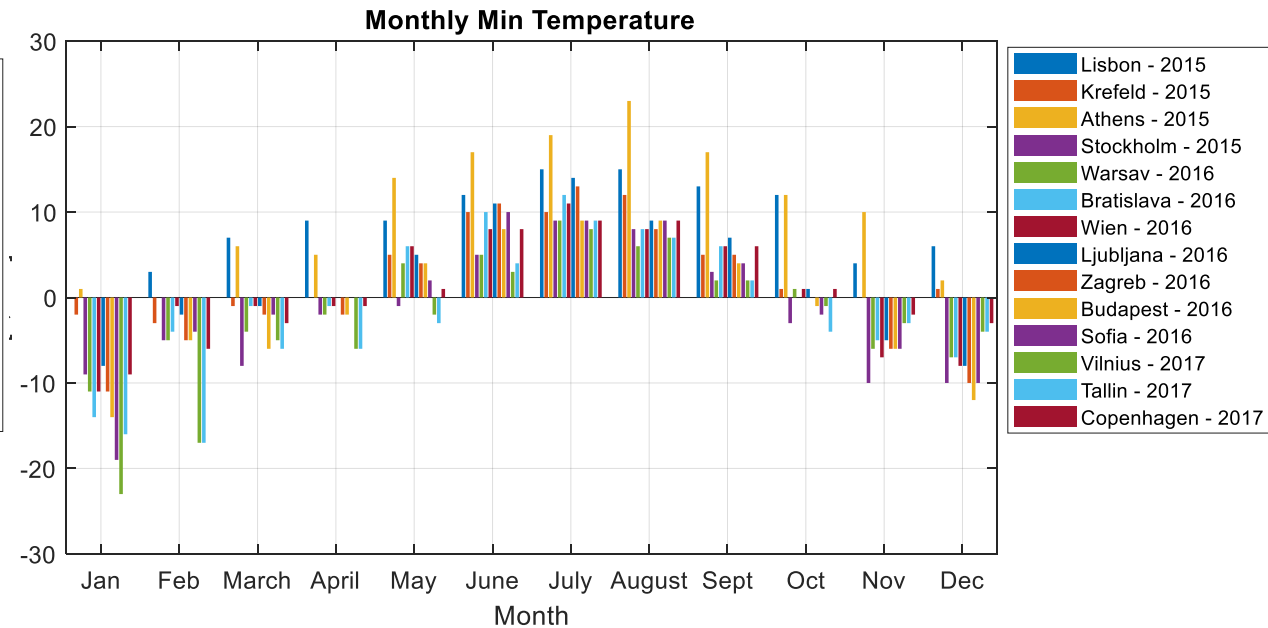
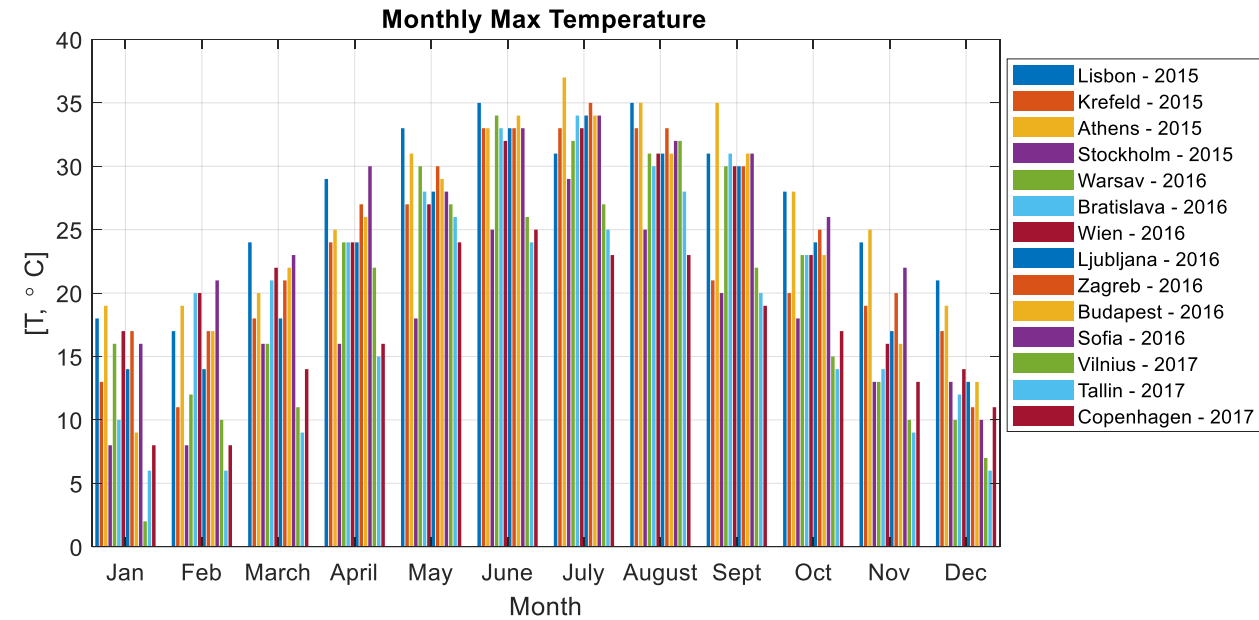


- Between 1a.m. and 5 a.m. in average almost all of vehicles are parked.
- > 90% of vehicles are parked at any given hour of the average day and in the month they are never less than 85%.

- Commercial vehicles show a higher percentage of fleet share for longer daily travelled distances in comparison to the private vehicles i.e. ≥ 150 km and 40-50 trips/day.
- In Budapest province 60 % of the commercial vehicles fleet travelled more than 150 km/day.



Ambient temperatures



Monthly maximum and minimum temperatures in several geographical areas

Capacity fade at 5 and 8 years and 100,000km and 160,000km Capacity reserve applied: 15% Vans

Legend	
 	Capacity fade above and equal 20%
 	Capacity fade above or equal to 10% and below 20%;
 	Capacity fade below 10%

Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km Years Driving to Set Threshold Li-Ion NCM-LMO (2015)			0 - 500 km/month						500 - 1,000 km/month						1,000 - 1,500 km/month						1,500 - 2,000 km/month						2,000+ km/month											
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	
Recharge Strategy #6	e-van 1 medium size	Copenhagen	6.6	12.3	55.9	>60	13.2	42.4	67.9	8.8	15.1	21.4	30.9	10.9	11.7	18.8	9.6	16.1	14.1	21.7	10.2	7.0	11.2	10.2	16.8	10.2	16.8	9.7	5.0	8.0	10.7	17.4	7.2	13.1	9.3	3.7	5.9	
		Budapest	9.5	15.9	41.6	>60	10.3	26.7	42.7	11.0	17.8	25.7	36.3	9.1	12.3	19.8	11.7	18.7	16.5	24.7	8.6	7.0	11.2	12.2	19.3	12.5	19.7	8.3	5.1	8.2								
		Wien Prov.	9.8	16.3	50.6	>60	10.0	33.2	53.2	11.7	18.7	27.3	38.4	8.6	12.6	20.2	12.9	20.2	16.4	24.6	7.9	6.3	10.1															
		Krefeld Prov.	10.3	16.9	45.5	>60	9.6	28.4	45.4	11.8	18.8	29.1	40.6	8.6	13.6	21.8																						
	e-van 2 small size	Copenhagen	7.6	13.6	59.1	>60	12.1	42.5	68.0	10.7	17.4	24.4	34.7	9.4	11.9	19.0	12.1	19.1	17.3	25.7	8.4	7.1	11.4	13.1	20.4	13.2	20.6	7.8	5.0	8.1	14.0	21.6	10.8	17.7	7.3	4.0	6.4	
		Budapest	10.7	17.4	45.4	>60	9.3	27.7	44.3	12.7	20.0	29.0	40.5	8.0	12.7	20.3	14.0	21.5	19.6	28.7	7.3	7.2	11.5	10.6	17.3	11.7	18.5	9.4	5.4	8.7								
		Wien Prov.	11.1	18.0	49.9	>60	9.0	30.2	48.4	13.4	20.9	30.7	42.6	7.6	13.0	20.8																						
		Krefeld Prov.	11.5	18.4	48.5	>60	8.8	28.6	45.8	13.4	20.8	32.9	45.4	7.6	14.4	23.0																						
	e-van 3 large size	Copenhagen	6.3	11.9	55.7	>60	13.6	43.0	68.8	8.0	14.1	20.6	30.0	11.6	12.0	19.3	8.6	14.8	13.1	20.4	11.1	7.1	11.3	9.0	15.3	8.9	15.2	10.7	5.0	7.9	9.4	15.8	5.2	10.6	10.4	3.4	5.5	
		Budapest	9.0	15.3	41.0	>60	10.7	27.1	43.4	10.1	16.7	25.2	35.6	9.7	12.8	20.5	10.6	17.3	15.9	24.0	9.4	7.3	11.7															
		Wien Prov.	9.5	16.0	46.5	>60	10.2	30.6	49.0	10.9	17.8	27.9	39.1	9.1	13.7	22.0																						
		Krefeld Prov.	9.9	16.5	43.3	>60	9.9	27.3	43.7	11.0	17.8	28.3	39.6	9.1	13.9	22.3																						
e-van 4 medium size	Copenhagen	5.3	10.7	52.2	>60	14.9	42.7	68.3	5.9	11.4	17.4	25.9	14.1	12.1	19.3	5.7	11.1	9.7	16.2	14.4	7.1	11.4	5.5	10.9	5.7	11.1	14.7	5.1	8.2									
	Budapest	7.8	13.8	38.2	>60	11.8	27.1	43.4	8.1	14.2	23.0	32.9	11.5	13.5	21.7	7.3	13.2	12.4	19.6	12.4	7.6	12.1																
	Wien Prov.	8.4	14.6	45.5	>60	11.2	32.1	51.3	8.7	14.9	21.9	31.5	10.9	12.1	19.7																							
	Krefeld Prov.	8.6	14.8	44.9	>60	11.0	31.2	49.9	9.2	15.6	26.7	37.7	10.5	14.9	23.8																							
Recharge Strategy #7	e-van 1 medium size	Copenhagen	6.7	12.4	59.3	>60	13.1	44.1	70.6	9.4	15.8	22.1	31.8	10.4	11.7	18.7	10.9	17.6	15.3	23.2	9.2	6.9	11.0	12.0	19.1	11.7	18.7	8.4	4.9	7.8	13.4	20.8	8.5	14.8	7.6	3.4	5.5	
		Budapest	9.6	16.1	43.2	>60	10.2	27.9	44.6	11.6	18.5	25.0	35.4	8.7	11.4	18.2	12.9	20.2	17.8	26.4	7.9	7.0	11.1	14.0	21.6	13.5	21.0	7.3	4.8	7.7	15.4	23.4	9.7	16.2	6.6	3.3	5.2	
		Wien Prov.	9.9	16.4	52.2	>60	9.9	34.2	54.8	12.2	19.3	26.6	37.4	8.3	11.7	18.8	13.5	21.0	18.7	27.5	7.6	7.0	11.2	14.5	22.2	14.0	21.6	7.1	4.8	7.8	16.1	24.2	9.9	16.5	6.4	3.2	5.1	
		Krefeld Prov.	10.3	17.0	47.3	>60	9.6	29.7	47.6	12.3	19.5	27.4	38.5	8.3	12.1	19.4	13.7	21.2	19.3	28.3	7.5	7.2	11.5	15.0	22.8	14.4	22.2	6.8	4.8	7.7	16.3	24.5	10.6	17.4	6.3	3.3	5.3	
	e-van 2 small size	Copenhagen	7.7	13.6	62.3	>60	12.0	44.1	70.5	11.3	18.2	25.1	35.5	8.9	11.7	18.7	13.4	20.8	18.3	26.9	7.6	6.9	11.0	15.0	22.8	14.6	22.3	6.8	4.9	7.8	16.6	24.8	11.7	18.9	6.2	3.6	5.7	
		Budapest	10.8	17.6	46.1	>60	9.2	27.9	44.6	13.4	20.9	28.3	39.6	7.6	11.7	18.7	15.4	23.3	20.5	29.8	6.6	6.8	10.9	17.0	25.3	16.4	24.6	6.0	4.8	7.7	18.8	27.6	13.0	20.4	5.4	3.4	5.5	
		Wien Prov.	11.0	17.9	54.8	>60	9.1	33.9	54.3	13.9	21.5	30.3	42.2	7.4	12.4	19.8	16.1	24.2	20.9	30.3	6.4	6.7	10.7	17.4	25.9	17.1	25.5	5.8	4.9	7.8	19.2	28.0	13.9	21.6	5.3	3.6	5.7	
		Krefeld Prov.	11.5	18.5	49.9	>60	8.7	29.5	47.3	14.0	21.6	31.2	43.3	7.3	12.8	20.5	15.8	23.8	22.2	32.0	6.5	7.3	11.8	18.8	27.6	16.5	24.9	5.4	4.4	7.0	20.0	29.0	13.6	21.2	5.0	3.3	5.3	
	e-van 3 large size	Copenhagen	6.4	12.0	57.7	>60	13.5	43.8	70.1	8.7	14.9	21.2	30.7	11.0	11.7	18.8	10.0	16.5	14.4	22.0	9.9	6.9	11.1	11.0	17.8	10.8	17.5	9.1	4.9	7.9	12.0	19.1	7.7	13.8	8.4	3.6	5.7	
		Budapest	9.2	15.5	42.1	>60	10.5	27.8	44.4	10.8	17.6	24.5	34.9	9.2	11.8	18.9	12.0	19.1	16.5	24.8	8.4	6.8	10.7	12.9	20.2	12.5	19.7	7.9	4.8	7.7	14.1	21.7	8.9	15.3	7.3	3.4	5.4	
		Wien Prov.	9.4	15.9	53.7	>60	10.3	36.0	57.6	11.4	18.3	26.4	37.2	8.8	12.4	19.8	12.6	19.9	17.4	25.9	8.1	6.9	11.0	13.3	20.7	13.6	21.1	7.7	5.1	8.2	14.6	22.3	9.9	16.5	7.0	3.5	5.7	
		Krefeld Prov.	10.0	16.6	45.5	>60	9.9	29.0	46.3	11.6	18.6	27.1	38.1	8.7	12.6	20.2	12.8	20.1	18.0	26.6	8.0	7.0	11.3															
e-van 4 medium size	Copenhagen	5.4	10.8	55.1	>60	14.7	44.1	70.5	6.9	12.6	18.5	27.3	12.9	11.8	18.8	7.6	13.5	11.6	18.5	12.1	6.9	11.1	8.1	14.1	7.9	13.9	11.6	4.9	7.9	8.7	14.9	5.0	10.3	11.0	3.6	5.7		
	Budapest	8.0	14.1	39.8	>60	11.6	28.1	45.0	8.9	15.2	22.0	31.7	10.7	12.0	19.2	9.6	16.0	13.7	21.2	10.2	6.8	10.9	10.1	16.7	9.8	16.4	9.8	4.9	7.8	10.6	17.3	6.2	11.8	9.4	3.4	5.5		
	Wien Prov.	8.5	14.7	49.5	>60	11.1	34.9	55.8	9.6	16.1	24.4	34.8	10.2	12.9	20.6	10.2	16.9	14.6	22.3	9.7	6.9	11.0	10.8	17.5	10.4	17.1	9.3	4.9	7.8									
	Krefeld Prov.	8.8	15.1	42.9	>60	10.8	29.0	46.4	9.8	16.3	24.9	35.4	10.0	13.0	20.9	10.5	17.2	16.3	24.6	9.4	7.5	12.1	11.1	18.0	12.5	19.7	9.0	5.5	8.9									

Capacity fade at 5 and 8 years and 100,000km and 160,000km

Capacity reserve applied: 15% Vans

Legend	
	Capacity fade above and equal 20%
	Capacity fade above or equal to 10% and below 20%;
	Capacity fade below 10%

Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km			0 - 500 km/month					500 – 1,000 km/month					1,000 -1,500 km/month					1,500 – 2,000 km/month					2,000+ km/month														
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km							
Years Driving to Set Threshold Li-Ion NCM-LMO (2015)																																					
Recharge Strategy #18	e-van 1 medium size	Copenhagen	6.9	12.6	49.3	≥60	12.9	38.0	60.8	9.3	15.6	22.2	31.9	10.5	11.8	18.9	10.7	17.4	15.6	23.6	9.4	7.1	11.4	11.8	18.8	12.0	19.1	8.6	5.1	8.1	12.8	20.1	8.8	15.2	8.0	3.7	5.9
		Budapest	9.5	16.0	43.7	≥60	10.2	28.4	45.4	11.4	18.4	25.1	35.6	8.8	11.6	18.5	12.7	19.9	17.8	26.4	8.0	7.1	11.3	13.8	21.3	13.5	20.9	7.4	4.9	7.8	14.9	22.7	10.8	17.7	6.9	3.7	6.0
		Wien Prov. Krefeld Prov.	9.8	16.3	54.9	≥60	10.0	36.2	57.9	12.0	19.1	26.6	37.5	8.4	11.9	19.1	13.4	20.8	18.2	26.9	7.6	6.9	11.0	14.4	22.1	12.0	19.1	7.1	4.2	6.7							
	e-van 2 small size	Copenhagen	7.9	14.0	52.2	≥60	11.7	38.0	60.8	11.1	17.9	25.5	36.0	9.1	12.1	19.4	13.1	20.4	18.5	27.2	7.8	7.1	11.4	14.6	22.3	15.1	22.9	7.0	5.2	8.3	18.0	26.6	14.2	22.0	5.6	3.9	6.3
		Budapest	10.8	17.5	46.6	≥60	9.3	28.4	45.4	13.3	20.7	28.6	40.0	7.7	12.0	19.2	15.1	23.0	20.6	29.9	6.8	7.0	11.2	16.6	24.9	16.4	24.6	6.1	4.9	7.9							
		Wien Prov. Krefeld Prov.	10.8	17.6	57.8	≥60	9.2	36.2	57.9	13.8	21.4	30.3	42.1	7.4	12.4	19.9	16.1	24.2	20.6	29.8	6.4	6.6	10.5														
	e-van 3 large size	Copenhagen	6.5	12.2	48.3	≥60	13.3	38.0	60.8	8.6	14.7	21.6	31.1	11.1	12.1	19.4	9.8	16.3	14.6	22.3	10.0	7.1	11.4	10.7	17.4	11.3	18.1	9.4	5.2	8.4							
		Budapest	9.1	15.5	42.7	≥60	10.6	28.4	45.4	10.7	17.4	24.9	35.3	9.3	12.1	19.4	11.8	18.8	16.7	24.9	8.6	7.0	11.2	12.7	19.9	12.3	19.4	8.0	4.9	7.8							
		Wien Prov. Krefeld Prov.	9.4	15.9	53.9	≥60	10.3	36.2	57.9	11.3	18.2	26.4	37.2	8.9	12.4	19.9	12.6	19.9	16.6	24.9	8.1	6.6	10.5														
	e-van 4 medium size	Copenhagen	5.5	11.0	46.1	≥60	14.6	38.4	61.5	6.7	12.5	19.1	28.1	13.0	12.4	19.8	7.4	13.3	12.1	19.2	12.3	7.3	11.7	7.8	13.8	8.7	14.9	11.8	5.4	8.6							
		Budapest	8.0	14.0	40.2	≥60	11.7	28.6	45.7	8.9	15.1	22.7	32.6	10.8	12.5	20.1	9.4	15.8	13.9	21.5	10.3	7.0	11.2	10.0	16.5	10.0	16.5	9.9	5.0	8.0							
		Wien Prov. Krefeld Prov.	8.4	14.6	51.2	≥60	11.2	36.2	57.9	9.5	15.9	24.7	35.1	10.3	13.2	21.1	10.2	16.8	13.1	20.4	9.7	6.2	9.9														
Recharge Strategy #19	e-van 1 medium size	Copenhagen	6.9	12.7	47.5	≥60	12.8	36.6	58.6	9.4	15.8	21.7	31.3	10.4	11.4	18.2	10.8	17.6	15.2	23.1	9.3	6.9	11.0	11.9	18.9	11.8	18.8	8.5	5.0	7.9	13.0	20.3	8.9	15.3	7.9	3.7	5.9
		Budapest	9.6	16.0	43.2	≥60	10.2	27.9	44.7	11.4	18.3	25.2	35.7	8.8	11.6	18.6	12.6	19.8	17.7	26.3	8.1	7.0	11.3	13.7	21.2	13.4	20.9	7.5	4.9	7.9	14.8	22.6	10.7	17.6	6.9	3.7	6.0
		Wien Prov. Krefeld Prov.	9.7	16.2	56.1	≥60	10.1	37.1	59.3	12.0	19.1	26.7	37.6	8.5	12.0	19.2	13.3	20.7	18.1	26.8	7.7	6.9	11.0	14.3	22.0	11.9	19.0	7.2	4.2	6.7							
	e-van 2 small size	Copenhagen	8.0	14.1	50.4	≥60	11.6	36.6	58.6	11.3	18.2	24.7	35.0	8.9	11.4	18.3	13.3	20.7	18.2	26.8	7.7	6.9	11.0	14.8	22.5	14.8	22.5	6.9	5.0	8.0	16.3	24.4	12.0	19.2	6.3	3.7	6.0
		Budapest	10.8	17.6	46.0	≥60	9.2	27.9	44.7	13.2	20.6	28.7	40.1	7.7	12.1	19.3	15.1	22.9	20.5	29.8	6.8	7.0	11.2	16.5	24.8	16.3	24.4	6.2	4.9	7.9	17.9	26.5	14.1	21.9	5.7	3.9	6.3
		Wien Prov. Krefeld Prov.	10.8	17.5	59.1	≥60	9.3	37.1	59.3	13.8	21.3	30.4	42.3	7.4	12.5	20.1	16.0	24.1	20.5	29.7	6.4	6.6	10.5														
	e-van 3 large size	Copenhagen	11.4	18.4	50.5	≥60	8.8	30.2	48.3	14.0	21.6	30.6	42.5	7.3	12.4	19.9	9.9	16.4	14.3	21.9	9.9	6.9	11.1	10.8	17.6	10.9	17.6	9.2	5.0	8.0	11.8	18.8	8.0	14.2	8.6	3.7	5.9
		Budapest	6.6	12.3	46.5	≥60	13.2	36.6	58.6	8.7	14.9	20.8	30.2	11.0	11.5	18.3	11.7	18.7	16.6	24.8	8.6	7.0	11.2	12.6	19.8	12.2	19.3	8.1	4.9	7.8							
		Wien Prov. Krefeld Prov.	9.1	15.5	42.2	≥60	10.6	27.9	44.7	10.7	17.4	25.0	35.4	9.3	12.2	19.5	12.5	19.8	16.6	24.8	8.1	6.6	10.5														
	e-van 4 medium size	Copenhagen	9.8	16.4	46.7	≥60	10.0	30.2	48.3	11.5	18.5	27.2	38.3	8.8	12.8	20.4	10.1	16.7	12.9	20.2	9.8	6.2	9.9	7.9	13.9	8.0	14.1	11.7	5.0	8.1	8.5	14.6	5.1	10.4	11.2	3.7	5.9
		Budapest	5.6	11.0	44.0	≥60	14.5	36.9	59.0	6.8	12.6	18.1	26.8	12.9	11.5	18.4	7.5	13.4	11.7	18.7	12.2	7.1	11.3	9.8	16.4	9.8	16.3	10.0	5.0	8.0							
		Wien Prov. Krefeld Prov.	8.0	14.0	39.6	≥60	11.7	28.0	44.8	8.8	15.1	22.7	32.6	10.8	12.6	20.1	9.3	15.7	13.8	21.3	10.4	7.0	11.2	10.1	16.7	12.9	20.2	9.8	6.2	9.9							

* Rech. Str. 18 lunch break DC

**Rech. Str. 19 lunch break DC and Night-charging AC



Capacity fade at 5 and 8 years and 100,000km and 160,000km

Capacity reserve applied: 15% Vans

Legend	
	Capacity fade above and equal 20%
	Capacity fade above or equal to 10% and below 20%;
	Capacity fade below 10%

Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km Years Driving to Set Threshold Li-Ion NCM-LMO (2015)			0 - 500 km/month					500 - 1,000 km/month					1,000 - 1,500 km/month					1,500 - 2,000 km/month					2,000+ km/month															
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km								
Recharge Strategy #8	e-van 1 medium size	Copenhagen	6.9	12.7	43.7	≥ 60	12.8	33.9	54.2	8.8	15.0	20.7	30.0	10.9	11.4	18.2	9.6	16.1	13.9	21.4	10.2	6.9	11.0	10.2	16.8	10.2	16.7	9.7	5.0	8.0	10.6	17.3	7.5	13.5	9.4	3.9	6.2	
		Budapest	9.6	16.1	38.6	≥ 60	10.2	23.9	38.3	10.9	17.7	26.9	37.9	9.2	13.2	21.1	11.9	18.9	16.4	24.5	8.5	6.8	10.9															
		Wien Prov. Krefeld Prov.	9.1	15.5	≥ 60	≥ 60	10.6	51.2	81.8	11.6	18.6	27.2	38.2	8.7	12.6	20.2																						
	e-van 2 small size	Copenhagen	8.0	14.1	46.6	≥ 60	11.6	33.9	54.2	10.7	17.4	23.7	33.8	9.3	11.4	18.2	12.1	19.2	16.8	25.1	8.4	6.9	11.1	13.1	20.4	13.2	20.5	7.8	5.0	8.1	13.8	21.3	10.4	17.2	7.4	3.9	6.2	
		Budapest	11.0	17.8	41.5	≥ 60	9.1	23.9	38.3	12.6	19.8	30.3	42.1	8.1	13.6	21.8	14.3	22.0	19.3	28.2	7.1	6.8	10.9															
		Wien Prov. Krefeld Prov.	10.0	16.6	≥ 60	≥ 60	9.8	51.2	81.8	13.3	20.7	31.9	44.1	7.7	13.9	22.2																						
	e-van 3 large size	Copenhagen	6.5	12.2	42.7	≥ 60	13.3	33.9	54.2	8.0	14.0	19.7	28.8	11.7	11.4	18.3	8.6	14.8	12.8	20.1	11.1	6.9	11.1	9.0	15.2	9.2	15.5	10.8	5.1	8.1	8.4	14.5	6.0	11.6	11.3	4.0	6.5	
		Budapest	9.2	15.5	37.7	≥ 60	10.5	23.9	38.3	10.1	16.7	26.8	37.7	9.8	14.0	22.4	10.6	17.4	17.9	26.6	9.4	8.3	13.2															
		Wien Prov. Krefeld Prov.	8.8	15.1	≥ 60	≥ 60	10.8	51.2	81.8	10.7	17.5	26.9	37.8	9.3	13.3	21.3																						
	e-van 4 medium size	Copenhagen	5.4	10.8	39.9	≥ 60	14.8	34.0	54.5	5.8	11.3	16.5	24.8	14.2	11.5	18.5	5.7	11.1	9.8	16.3	14.5	7.2	11.5	5.3	10.7	6.2	11.8	15.0	5.4	8.7								
		Budapest	7.9	13.9	34.7	≥ 60	11.7	23.7	37.9	8.3	14.4	24.1	34.4	11.4	14.2	22.7																						
		Wien Prov. Krefeld Prov.	7.9	14.0	≥ 60	≥ 60	11.7	51.2	81.8	8.9	15.2	24.0	34.2	10.8	13.3	21.3																						
Recharge Strategy #17	e-van 1 medium size	Copenhagen	7.9	14.0	34.4	51.5	11.7	23.5	37.5	9.4	15.8	21.6	31.2	10.3	11.3	18.1	10.8	17.5	15.2	23.1	9.3	6.9	11.0	12.0	19.0	11.7	18.6	8.5	4.9	7.8	13.8	21.3	8.0	14.1	7.4	3.2	5.1	
		Budapest	10.3	16.9	36.5	52.3	9.6	21.0	33.6	11.6	18.6	24.2	34.4	8.7	10.9	17.4	12.8	20.0	18.0	26.6	8.0	7.1	11.3	13.9	21.4	13.5	21.0	7.4	4.9	7.8	15.5	23.5	9.6	16.1	6.6	3.3	5.2	
		Wien Prov. Krefeld Prov.	10.8	17.6	39.6	57.6	9.2	22.6	36.1	12.2	19.4	25.6	36.3	8.3	11.2	17.9	13.5	20.9	18.7	27.4	7.6	7.0	11.2	14.8	22.5	14.2	21.9	6.9	4.8	7.7	15.8	23.9	9.3	15.7	6.5	3.1	5.0	
	e-van 2 small size	Copenhagen	9.4	15.8	36.5	53.4	10.4	22.6	36.1	11.2	18.1	25.0	35.4	9.0	11.7	18.7	13.3	20.6	18.1	26.7	7.7	6.9	11.0	15.0	22.8	14.5	22.2	6.9	4.8	7.7	17.4	25.8	11.0	17.8	5.9	3.2	5.1	
		Budapest	11.8	18.8	38.5	54.2	8.6	20.2	32.3	13.5	20.9	27.7	38.8	7.6	11.3	18.1	15.2	23.1	20.5	29.8	6.7	6.9	11.1	16.7	25.0	16.5	24.7	6.1	4.9	7.9	18.6	27.3	12.8	20.2	5.4	3.4	5.5	
		Wien Prov. Krefeld Prov.	12.3	19.5	41.7	59.7	8.3	21.8	35.0	14.0	21.6	29.5	41.1	7.3	11.9	19.0	15.9	24.0	21.0	30.4	6.4	6.8	10.9	17.9	26.5	16.8	25.1	5.7	4.7	7.5	19.6	28.6	14.2	22.0	5.1	3.6	5.7	
	e-van 3 large size	Copenhagen	7.5	13.4	32.4	47.9	12.2	22.4	35.8	8.7	14.9	21.2	30.6	11.0	11.7	18.8	9.9	16.5	14.2	21.8	9.9	6.9	11.0	11.0	17.8	10.7	17.4	9.1	4.9	7.8	12.7	19.9	6.8	12.6	8.0	3.1	5.0	
		Budapest	9.8	16.3	34.3	48.8	10.0	20.0	32.0	10.8	17.6	24.0	34.2	9.2	11.5	18.3	11.9	19.0	16.6	24.8	8.5	6.9	11.0	12.9	20.2	12.5	19.7	7.9	4.9	7.8	14.0	21.6	9.3	15.7	7.3	3.5	5.6	
		Wien Prov. Krefeld Prov.	10.4	17.1	37.6	54.2	9.5	21.6	34.6	11.4	18.4	25.8	36.5	8.8	12.0	19.1	12.6	19.8	17.6	26.1	8.1	7.0	11.2	13.5	21.0	13.0	20.4	7.6	4.8	7.7								
	e-van 4 medium size	Copenhagen	6.2	11.8	29.3	43.6	13.7	22.0	35.2	6.8	12.6	18.7	27.5	12.9	11.9	19.1	7.6	13.5	11.6	18.6	12.1	7.0	11.2	8.2	14.3	7.9	14.0	11.4	4.9	7.8	9.2	15.5	4.3	9.5	10.5	3.2	5.1	
		Budapest	8.4	14.6	31.4	45.0	11.2	19.8	31.7	8.9	15.3	21.9	31.6	10.7	11.9	19.1	9.6	16.0	13.8	21.4	10.2	6.9	11.0	10.1	16.7	10.1	16.7	9.8	5.0	8.0	10.6	17.4	6.5	12.2	9.4	3.5	5.6	
		Wien Prov. Krefeld Prov.	9.0	15.4	34.3	49.5	10.6	21.2	33.9	9.6	16.1	24.3	34.6	10.2	12.8	20.5	10.3	17.0	14.7	22.4	9.6	6.9	11.0	11.1	18.0	10.2	16.9	9.0	4.7	7.5								

* Rech. Str. 17 SOC & trip length DC



Capacity fade at 5 and 8 years and 100,000km and 160,000km Capacity reserve applied: 15% Vans

Legend	
 	Capacity fade above and equal 20%
 	Capacity fade above or equal to 10% and below 20%;
 	Capacity fade below 10%

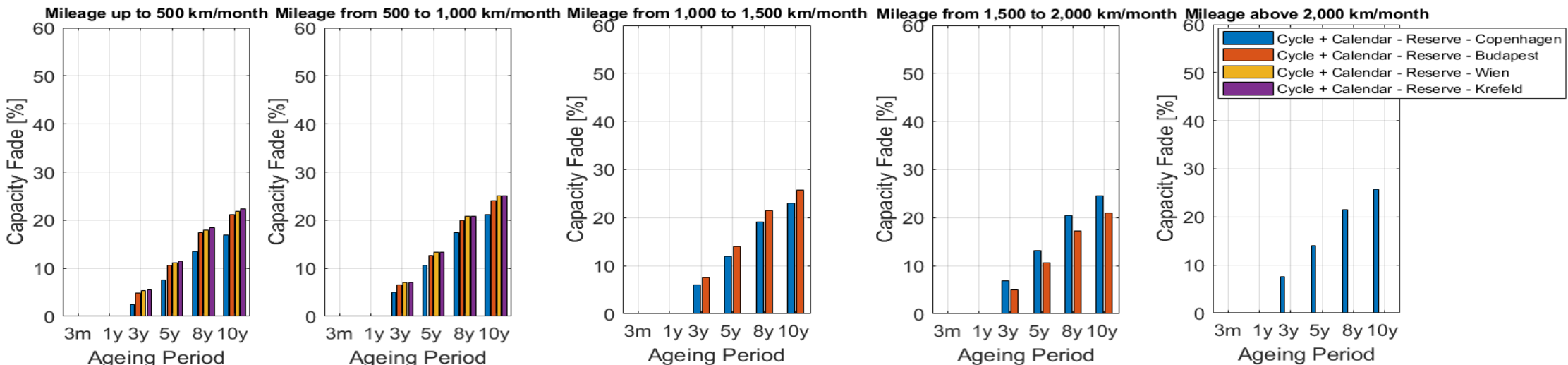
Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km Years Driving to Set Threshold Li-Ion NCM-LMO (2015)			0 - 500 km/month					500 – 1,000 km/month					1,000 -1,500 km/month					1,500 – 2,000 km/month					2,000+ km/month														
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km
Recharge Strategy #16	e-van 1 medium size	Copenhagen	6.6	12.3	≥60	≥60	13.2	70.8	113.3	8.7	14.9	22.1	31.8	11.0	12.3	19.7	9.6	16.0	13.6	21.1	10.2	6.8	10.9	10.1	16.6	9.7	16.2	9.8	4.9	7.8	10.5	17.2	6.0	11.5	9.5	3.4	5.4
		Budapest	9.4	15.8	46.9	≥60	10.3	31.3	50.0	10.9	17.7	25.4	36.0	9.2	12.2	19.6	11.5	18.4	15.9	24.0	8.8	6.8	10.9	11.8	18.8	11.3	18.2	8.6	4.8	7.7	11.9	18.9	6.8	12.6	8.5	3.3	5.2
		Wien Prov.	9.7	16.2	≥60	≥60	10.1	59.5	95.2	11.6	18.6	27.1	38.1	8.7	12.6	20.1	12.3	19.5	17.0	25.4	8.3	6.9	11.0	12.3	19.5	12.0	19.0	8.3	4.9	7.8	12.4	19.5	7.4	13.4	8.2	3.4	5.4
	e-van 2 small size	Krefeld Prov.	10.2	16.8	51.9	≥60	9.7	33.4	53.4	11.8	18.8	29.0	40.5	8.6	13.6	21.7	12.6	19.8	17.4	25.8	8.1	6.9	11.0	12.9	20.1	12.7	19.9	7.9	4.9	7.9	12.8	20.0	8.4	14.7	8.0	3.6	5.7
		Copenhagen	7.6	13.5	≥60	≥60	12.1	70.8	113.3	10.7	17.4	24.3	34.5	9.4	11.8	18.9	12.1	19.2	16.6	24.8	8.4	6.8	10.9	13.1	20.4	12.7	19.9	7.8	4.9	7.8	14.0	21.6	9.2	15.6	7.3	3.5	5.6
		Budapest	10.6	17.4	49.9	≥60	9.4	31.2	50.0	12.8	20.0	27.3	38.4	8.0	11.7	18.7	14.0	21.5	18.7	27.5	7.3	6.8	10.9	14.8	22.6	14.2	21.9	6.9	4.8	7.7	15.5	23.4	10.0	16.6	6.6	3.3	5.4
	e-van 3 large size	Wien Prov.	10.7	17.5	≥60	≥60	9.3	59.6	95.3	13.5	20.9	29.6	41.2	7.6	12.4	19.8	14.7	22.5	19.7	28.7	7.0	6.8	10.9	15.3	23.1	14.7	22.5	6.7	4.8	7.7	15.9	24.0	10.7	17.5	6.4	3.4	5.5
		Krefeld Prov.	11.4	18.3	55.0	≥60	8.8	33.4	53.4	13.6	21.1	30.7	42.6	7.5	12.9	20.6	15.1	22.9	19.6	28.6	6.8	6.6	10.6	15.7	23.7	15.6	23.6	6.5	5.0	7.9	16.4	24.5	11.5	18.5	6.3	3.6	5.7
		Copenhagen	6.3	11.9	≥60	≥60	13.6	70.8	113.3	8.0	14.0	19.8	28.9	11.7	11.6	18.5	8.6	14.7	12.5	19.6	11.1	6.8	10.9	8.9	15.1	8.5	14.7	10.9	4.9	7.8	9.0	15.3	5.1	10.5	10.7	3.5	5.6
	e-van 4 medium size	Budapest	9.0	15.3	45.8	≥60	10.7	31.3	50.0	10.1	16.7	23.1	33.1	9.8	11.6	18.6	10.4	17.0	14.6	22.3	9.6	6.8	10.9	10.5	17.2	10.1	16.6	9.5	4.8	7.7	10.4	17.0	5.9	11.5	9.6	3.4	5.5
		Wien Prov.	9.3	15.8	≥60	≥60	10.4	59.6	95.4	10.9	17.6	25.3	35.8	9.2	12.2	19.5	11.2	18.0	15.5	23.5	9.0	6.8	10.9	11.0	17.7	10.5	17.2	9.2	4.8	7.7	10.9	17.6	6.5	12.2	9.2	3.5	5.5
		Krefeld Prov.	9.8	16.3	50.9	≥60	10.0	33.4	53.5	11.0	17.8	25.8	36.5	9.1	12.4	19.9	11.4	18.3	15.5	23.4	8.8	6.7	10.7	11.3	18.2	10.9	17.7	8.9	4.8	7.7	11.0	17.7	6.2	11.9	9.2	3.3	5.3
Recharge Strategy #116	e-van 1 medium size	Copenhagen	5.3	10.7	≥60	≥60	14.9	74.3	118.9	5.7	11.1	16.3	24.5	14.4	11.5	18.4	5.4	10.8	8.9	15.1	14.8	6.8	10.9	4.9	10.1	4.6	9.8	15.6	4.9	7.8	4.2	9.2	≤5	6.0	16.9	3.7	6.0
		Budapest	7.7	13.7	45.9	≥60	11.9	33.8	54.0	7.8	13.8	19.7	28.9	11.9	11.7	18.7	7.1	12.9	10.8	17.5	12.6	6.8	10.9	6.4	12.0	6.0	11.5	13.5	4.8	7.7	5.2	10.5	≤5	6.7	15.2	3.6	5.8
		Wien Prov.	8.3	14.5	≥60	≥60	11.3	61.9	99.1	8.6	14.9	21.7	31.3	11.0	12.1	19.3	7.7	13.6	11.2	18.1	12.0	6.7	10.7	6.9	12.7	6.6	12.3	12.8	4.9	7.8	5.9	11.4	≤5	7.7	14.1	3.7	5.9
	e-van 2 small size	Krefeld Prov.	8.6	14.8	51.2	≥60	11.0	35.9	57.4	8.8	15.1	22.4	32.3	10.8	12.4	19.8	8.2	14.3	11.8	18.8	11.5	6.7	10.7	7.1	12.9	7.1	12.9	12.7	5.0	8.0	5.1	10.4	≤5	5.8	15.3	3.3	5.3
		Copenhagen	7.1	12.9	39.8	≥60	12.6	30.2	48.3	8.7	15.0	20.5	29.8	10.9	11.3	18.0	9.6	16.1	13.8	21.3	10.2	6.8	10.9	10.2	16.8	9.9	16.4	9.7	4.9	7.8	10.6	17.3	7.1	13.0	9.4	3.7	6.0
		Budapest	9.3	15.7	42.2	≥60	10.4	27.5	44.0	10.9	17.6	23.7	33.9	9.2	11.3	18.0	11.5	18.4	16.0	24.1	8.8	6.9	11.0	11.8	18.8	11.3	18.2	8.6	4.8	7.7	12.0	19.0	8.1	14.2	8.5	3.7	5.9
	e-van 3 large size	Wien Prov.	9.8	16.3	49.2	≥60	10.0	32.2	51.6	11.6	18.6	25.1	35.6	8.7	11.4	18.2	12.3	19.4	16.9	25.2	8.3	6.8	11.0	12.3	19.4	11.8	18.9	8.3	4.8	7.7	12.5	19.7	8.8	15.2	8.2	3.8	6.0
		Krefeld Prov.	10.1	16.8	45.6	≥60	9.7	28.7	45.9	11.8	18.8	25.6	36.2	8.6	11.5	18.5	12.5	19.7	17.5	25.9	8.1	7.0	11.2	12.9	20.2	13.3	20.7	7.9	5.2	8.2							
		Copenhagen	8.3	14.4	42.7	≥60	11.4	30.2	48.3	10.7	17.4	23.5	33.6	9.3	11.3	18.1	12.1	19.2	16.8	25.0	8.4	6.9	11.0	13.1	20.4	12.9	20.2	7.8	4.9	7.9	13.9	21.3	10.2	16.9	7.4	3.8	6.1
	e-van 4 medium size	Budapest	10.6	17.3	45.1	≥60	9.4	27.5	44.0	12.8	20.0	26.9	37.8	8.0	11.5	18.3	13.9	21.5	18.8	27.5	7.4	6.8	10.9	14.7	22.4	14.3	22.0	7.0	4.9	7.8	15.3	23.2	11.2	18.2	6.7	3.7	6.0
		Wien Prov.	10.9	17.8	52.1	≥60	9.1	32.2	51.6	13.5	20.9	28.4	39.8	7.6	11.7	18.8	14.6	22.4	19.3	28.3	7.0	6.7	10.8	15.2	23.1	14.7	22.5	6.7	4.8	7.7	15.1	22.9	11.9	19.0	6.8	4.0	6.4
		Krefeld Prov.	11.2	18.1	51.8	≥60	9.0	31.5	50.4	13.5	20.9	32.1	44.4	7.6	13.8	22.1																					
e-van 3 large size	Copenhagen	6.7	12.4	38.8	≥60	13.1	30.2	48.3	8.0	14.0	19.5	28.6	11.7	11.3	18.2	8.6	14.8	12.7	19.9	11.1	6.9	11.0	9.0	15.3	8.8	15.0	10.7	4.9	7.9	9.2	15.5	6.1	11.7	10.6	3.8	6.1	
	Budapest	8.9	15.2	41.2	≥60	10.8	27.5	44.0	10.1	16.6	22.9	32.9	9.8	11.5	18.4	10.4	17.0	14.6	22.4	9.6	6.8	10.9	10.5	17.1	10.3	16.9	9.5	4.9	7.9	10.5	17.1	7.1	13.1	9.5	3.8	6.1	
	Wien Prov.	9.4	15.8	48.2	≥60	10.3	32.2	51.6	10.8	17.6	24.5	34.8	9.2	11.8	18.8	11.1	17.9	15.1	22.9	9.1	6.6	10.6	11.0	17.8	10.5	17.2	9.1	4.8	7.7								
e-van 4 medium size	Krefeld Prov.	9.7	16.2	44.6	≥60	10.1	28.7	45.9	11.0	17.8	25.2	35.7	9.1	12.0	19.2	11.3	18.2	15.8	23.9	8.9	6.9	11.0	11.2	18.0	11.1	18.0	9.0	5.0	8.0								
	Copenhagen	5.4	10.8	35.8	63.8	14.8	30.2	48.3	5.8	11.2	16.3	24.5	14.3	11.4	18.3	5.6	11.0	9.3	15.7	14.6	7.0	11.2	5.2	10.5	5.2	10.5	15.2	5.0	8.0	4.9	10.1	≤5	7.3	15.7	3.9	6.3	
	Budapest	7.6	13.5	38.2	62.4	12.1	27.6	44.1	7.8	13.8	19.8	29.0	11.8	11.7	18.7	7.2	13.0	11.0	17.8	12.5	6.9	11.0	6.5	12.2	6.6	12.2	13.3	5.0	8.1	4.8	10.0	≤5	7.0	15.8	3.9	6.2	
e-van 4 medium size	Wien Prov.	8.2	14.3	45.3	83.9	11.4	32.2	51.6	8.6	14.9	21.7	31.4	11.0	12.1	19.4	7.8	13.8	11.3	18.2	11.9	6.7	10.6	7.2	13.0	7.1	12.9	12.6	5.0	8.0								
	Krefeld Prov.	8.5	14.7	42.1	71.2	11.2	29.1	46.6	8.9	15.2	22.9	32.9	10.8	12.6	20.2	8.6	14.7	12.8	20.0	11.1	6.9	11.1	7.2	13.1	7.3	13.1	12.5	5.0	8.0								

* Rech. Str. 16 Each return home/depot AC

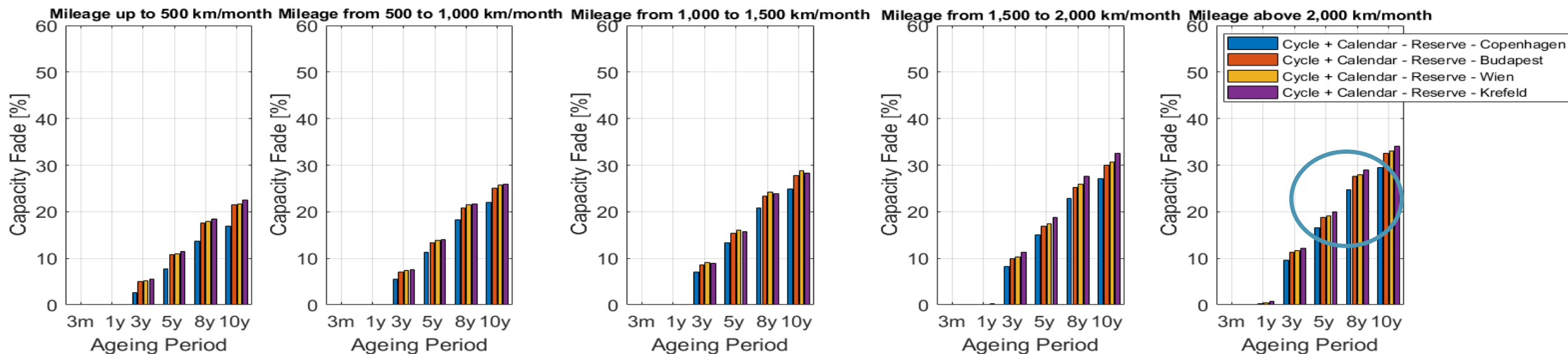
**Rech. Str. 116 Last return home/depot of the day AC

Capacity fade all cities – Van-2 Small-sized

Rech. Str. 6
AC random

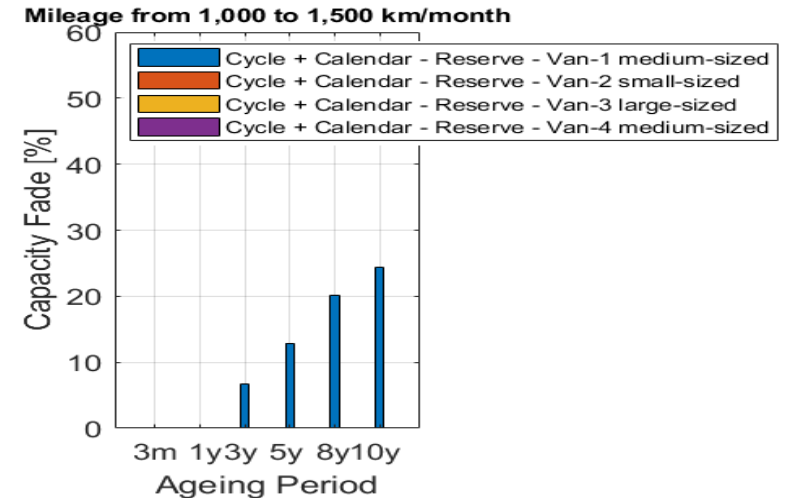
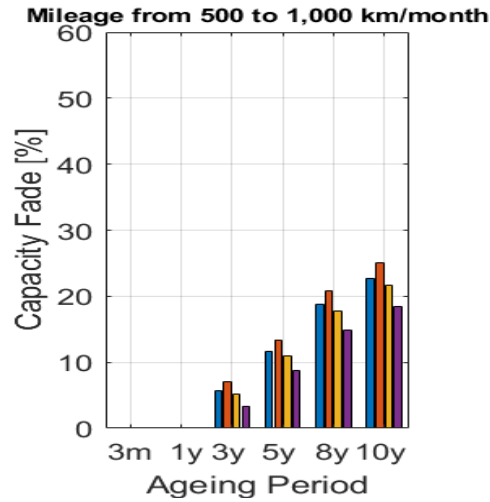
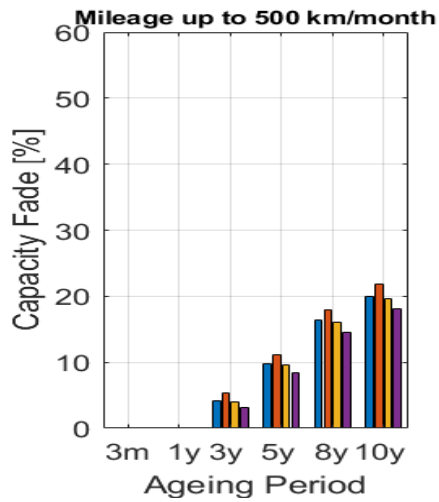


Rech. Str. 7
DC random

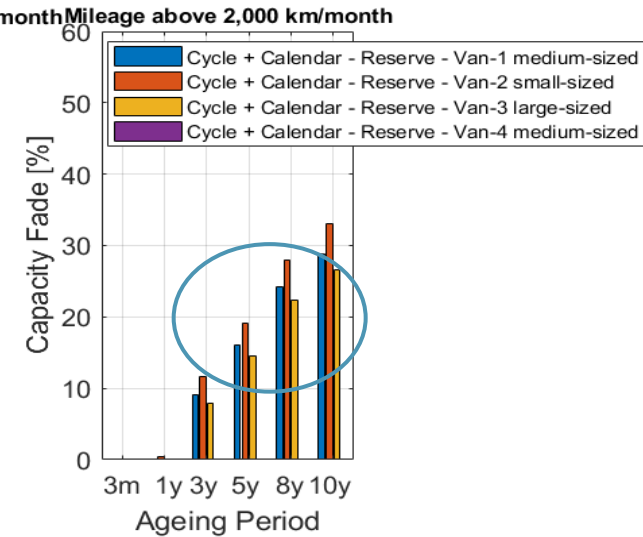
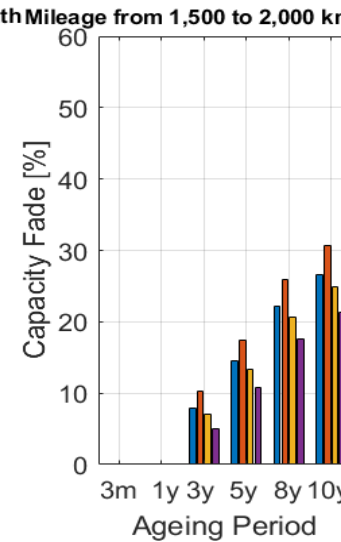
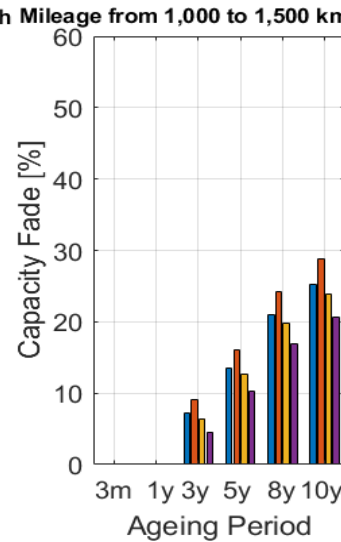
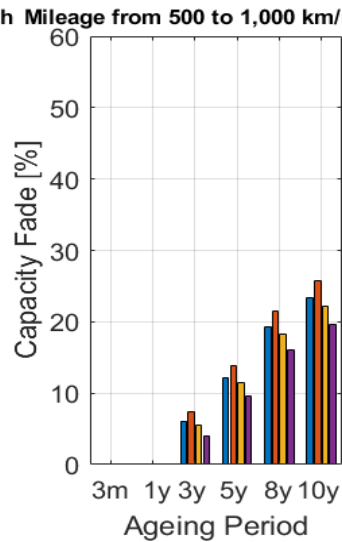
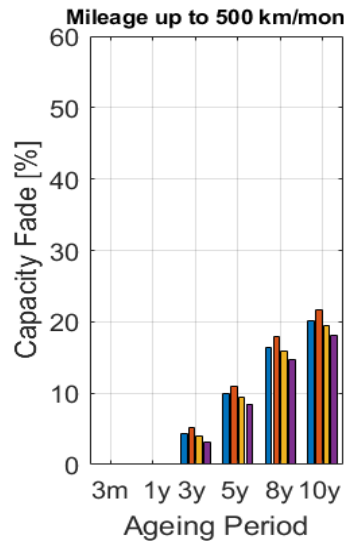


Capacity fade Wien – All vans

Rech. Str. 6
AC

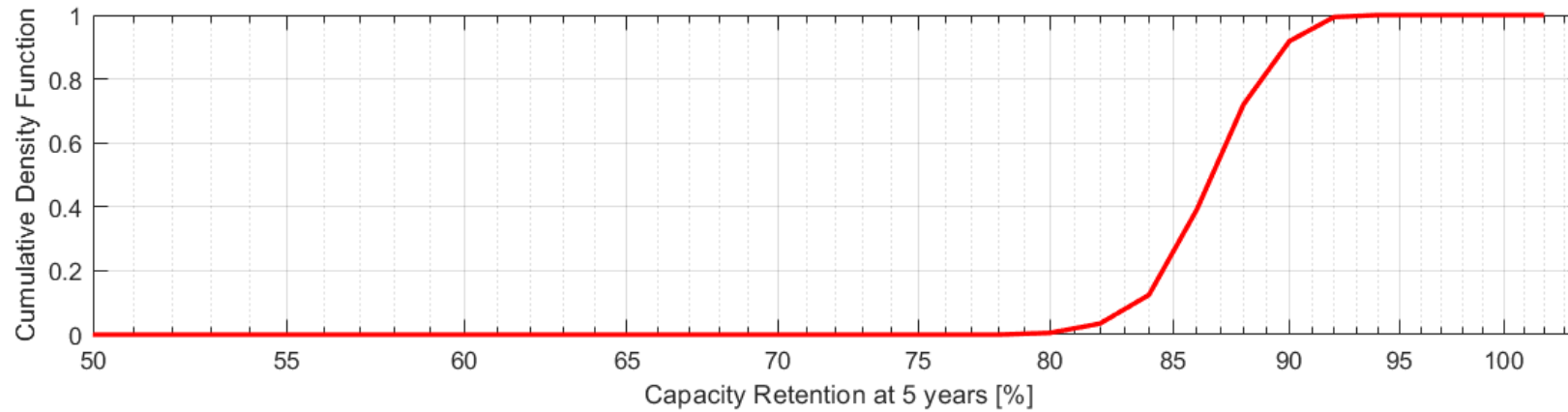


Rech. Str. 7
DC

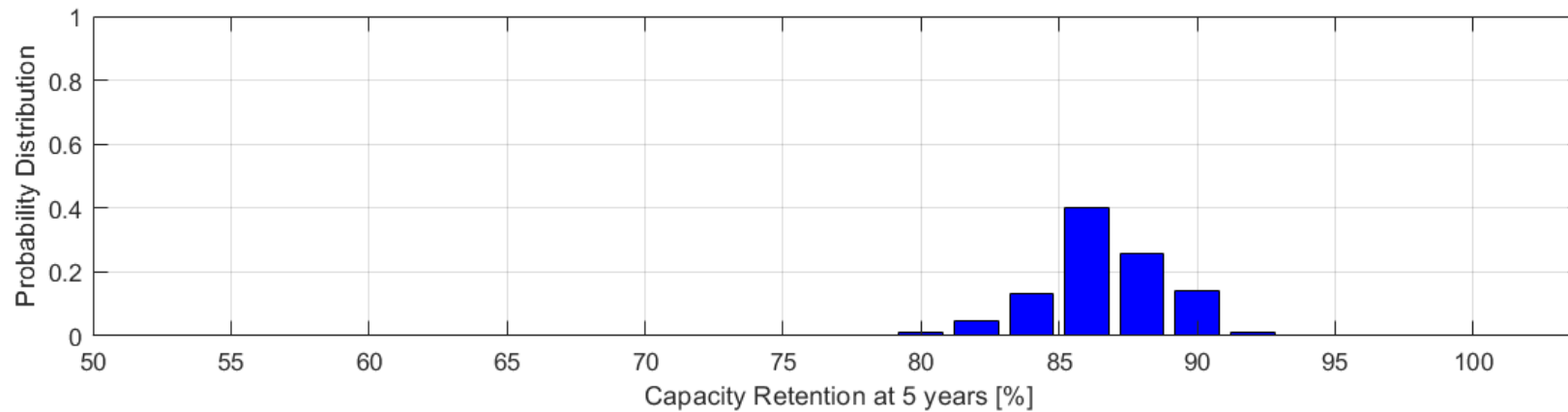


Capacity retention at 5 years – Van-2 Str.6 & Str.7

All km/month bins distributions



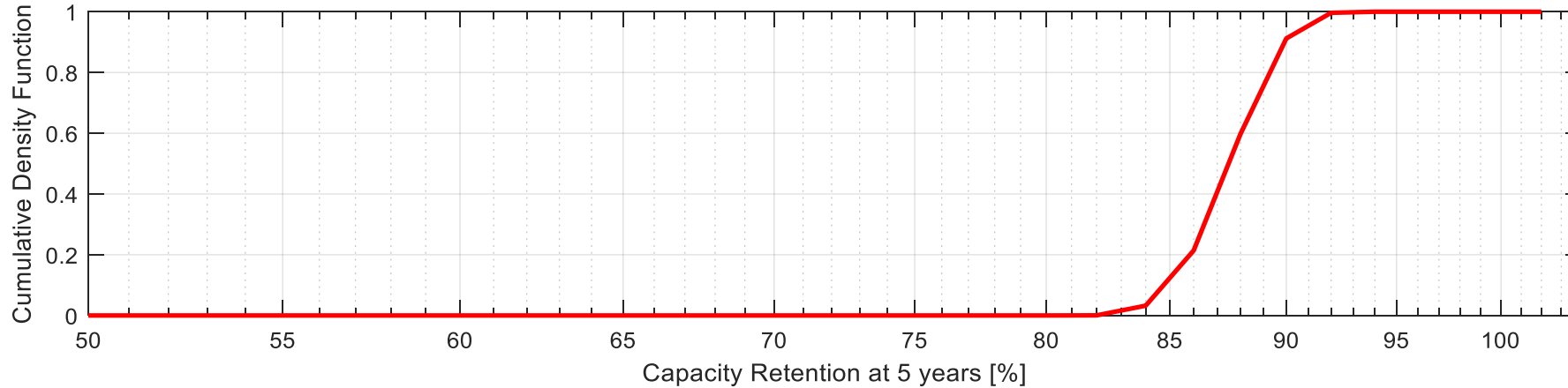
>75% ?



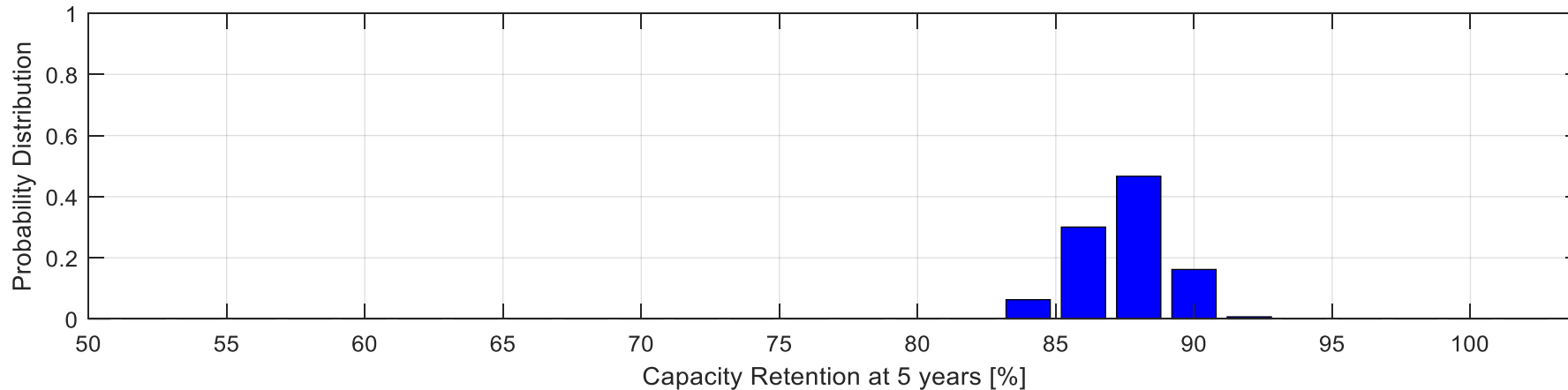
Li-Ion NCM-LMO (2015)
Wien province area

Capacity retention at 5 years - BEV-1 Str.1&Str.2

All km/month bins distributions



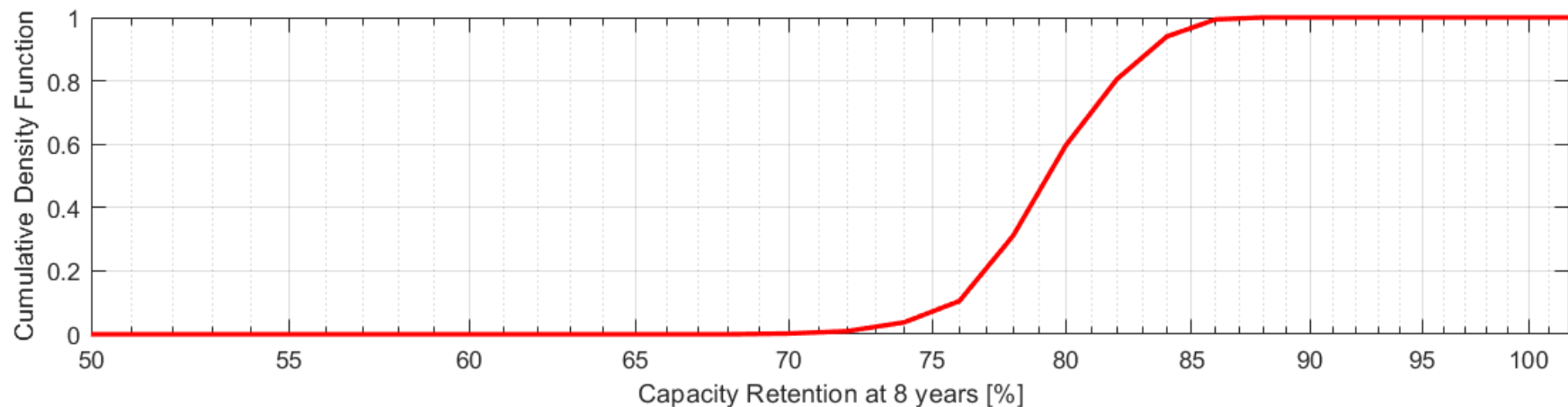
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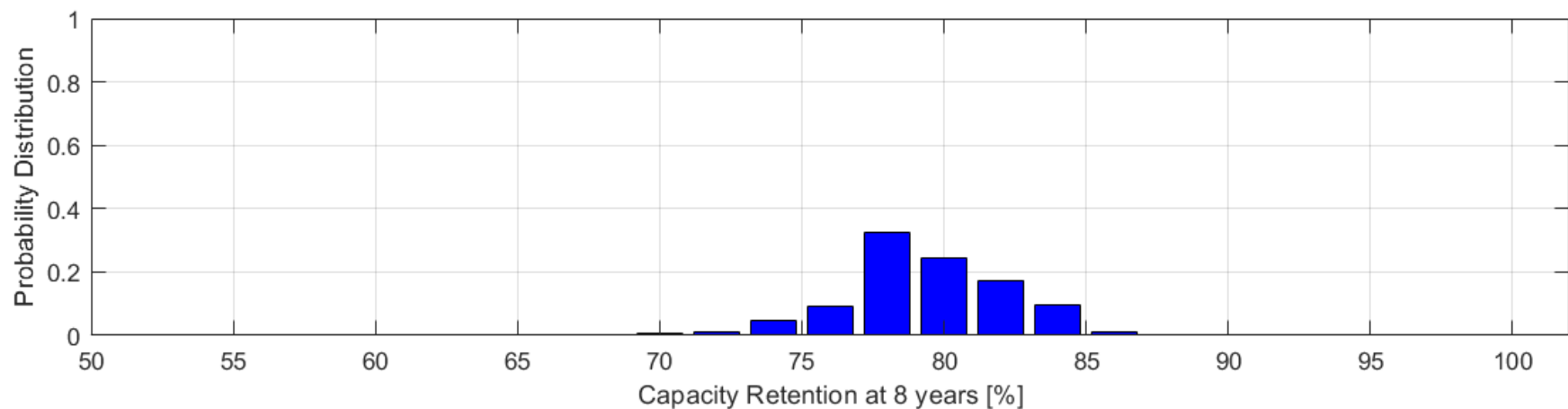
Li-Ion NCM-LMO (2015)
Modena province area

Capacity retention at 8 years – Van-2 Str.6 & Str.7

All km/month bins distributions



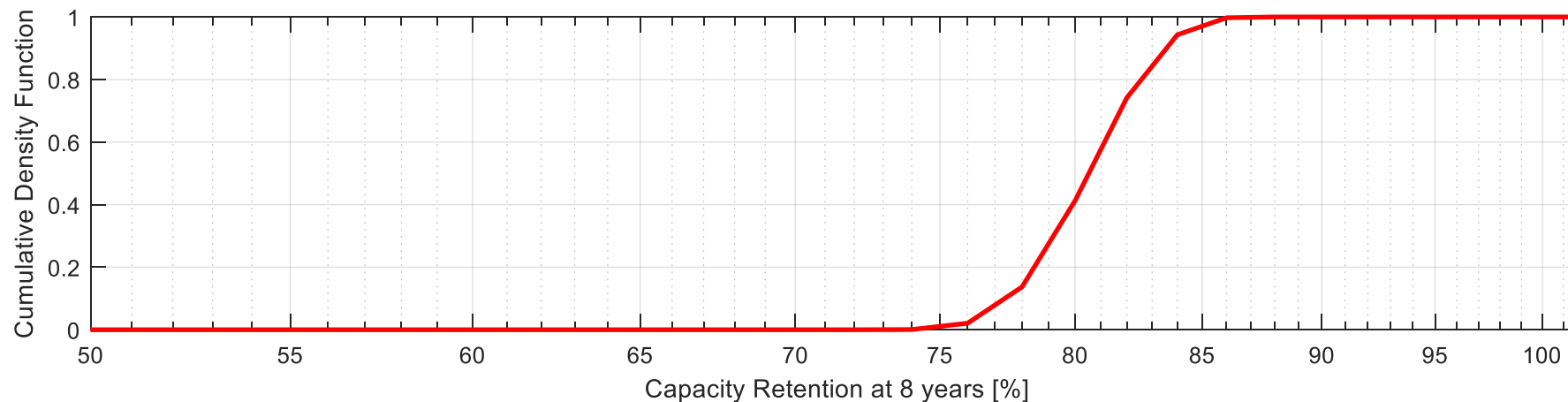
>65% ?



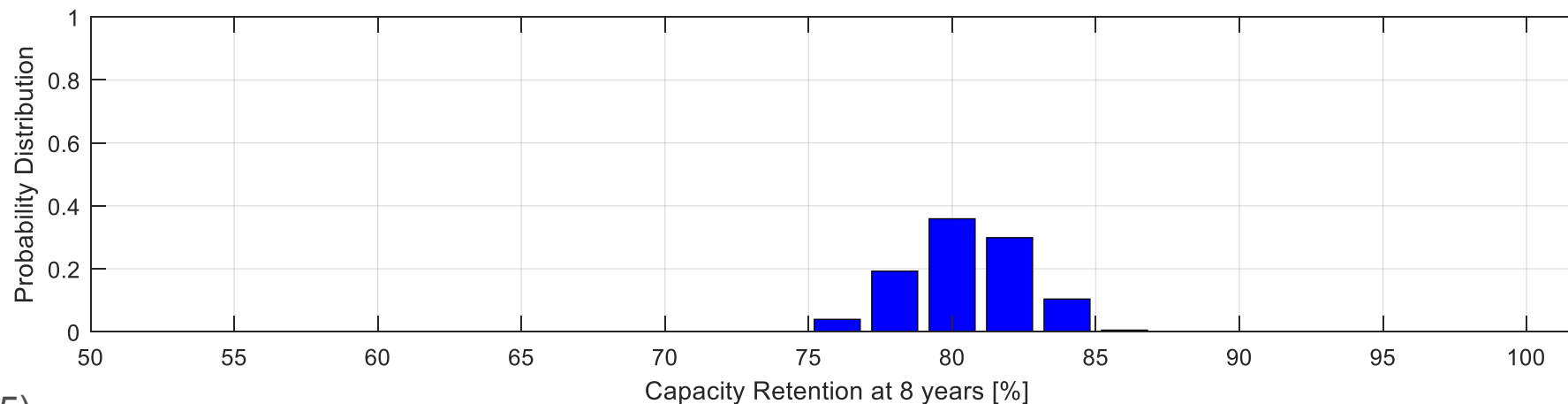
Li-Ion NCM-LMO (2015)
Wien province area

Capacity retention at 8 years - BEV-1 Str.1&Str.2

All km/month bins distributions



>70%



Li-Ion NCM-LMO (2015)
Modena province area

Adding the payload

- Increasing of the energy consumption due to the payload

Capacity fade at 5 and 8 years and 100,000km and 160,000km

Capacity reserve applied: 15% Vans

With payload

Legend	
	Capacity fade above and equal 20%
	Capacity fade above or equal to 10% and below 20%;
	Capacity fade below 10%

Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km Years Driving to Set Threshold Li-Ion NCM-LMO (2015)			0 - 500 km/month					500 – 1,000 km/month					1,000 -1,500 km/month					1,500 – 2,000 km/month					2,000+ km/month															
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km								
Recharge Strategy #6	e-van 1 mediu m size	Copenhagen	7.0	12.8	56.6	≥ 60	12.7	42.2	67.6	9.3	15.6	22.3	32.1	10.5	11.9	19.1	10.1	16.7	14.9	22.7	9.8	7.1	11.4	10.6	17.2	10.8	17.5	9.5	5.1	8.1	11.0	17.8	7.1	13.0	9.1	3.6	5.8	
		Budapest	9.9	16.4	43.3	≥ 60	9.9	27.4	43.8	11.3	18.2	27.7	38.8	8.9	13.3	21.2	12.3	19.4	16.9	25.2	8.3	6.9	11.0															
		Wien Prov.	10.2	16.8	52.0	≥ 60	9.7	33.5	53.6	12.0	19.0	30.6	42.6	8.5	14.4	23.1																						
		Krefeld Prov.	10.7	17.5	46.8	≥ 60	9.3	28.6	45.8	12.2	19.3	30.8	42.8	8.3	14.3	22.9																						
	e-van 2 small size	Copenhagen	8.1	14.1	≥ 60	≥ 60	11.6	43.8	70.0	11.3	18.2	26.0	36.6	8.9	12.2	19.5	12.9	20.2	18.2	26.8	7.9	7.1	11.3															
		Budapest	11.2	18.1	47.3	≥ 60	8.9	28.2	45.1	13.3	20.6	30.7	42.6	7.7	13.2	21.1	14.8	22.5	21.1	30.5	6.9	7.4	11.8															
		Wien Prov.	11.5	18.4	55.2	≥ 60	8.8	33.5	53.6	13.9	21.4	33.1	45.6	7.4	14.0	22.4																						
		Krefeld Prov.	11.9	18.9	53.0	≥ 60	8.5	31.2	50.0	14.1	21.7	33.9	46.7	7.3	14.3	22.8																						
	e-van 3 large size	Copenhagen	6.6	12.2	58.5	≥ 60	13.2	43.9	70.3	8.4	14.5	21.4	30.9	11.3	12.2	19.5	9.0	15.2	13.7	21.2	10.8	7.2	11.5	9.4	15.7	8.8	15.0	10.4	4.8	7.6								
		Budapest	9.4	15.8	43.1	≥ 60	10.4	28.2	45.2	10.4	17.1	26.3	37.1	9.5	13.3	21.3	11.0	17.8	14.9	22.6	9.1	6.6	10.6															
		Wien Prov.	9.7	16.2	54.9	≥ 60	10.1	36.4	58.2	11.3	18.2	29.4	41.0	8.9	14.3	22.9																						
		Krefeld Prov.	10.1	16.7	47.8	≥ 60	9.7	30.5	48.8	11.3	18.2	28.0	39.2	8.9	13.4	21.5																						
e-van 4 mediu m size	Copenhagen	5.4	10.8	58.4	≥ 60	14.7	45.8	73.3	5.9	11.4	17.6	26.1	14.1	12.2	19.6	5.4	10.8	9.8	16.4	14.8	7.4	11.9																
	Budapest	7.9	13.9	43.2	≥ 60	11.7	31.2	50.0	8.0	14.1	23.2	33.1	11.6	13.8	22.1																							
	Wien Prov.	8.3	14.5	66.2	≥ 60	11.3	44.6	71.4	8.6	14.8	19.3	28.3	11.0	10.6	16.9																							
	Krefeld Prov.	8.6	14.9	53.8	≥ 60	11.0	37.5	60.0	9.2	15.6	26.5	37.5	10.5	14.8	23.6																							
Recharge Strategy #7	e-van 1 mediu m size	Copenhagen	7.1	12.9	≥ 60	≥ 60	12.6	43.8	70.2	10.1	16.7	23.4	33.4	9.8	11.8	18.8	11.8	18.9	16.4	24.5	8.6	6.8	10.9	13.1	20.4	12.9	20.1	7.8	4.9	7.9	14.5	22.2	9.9	16.5	7.1	3.6	5.7	
		Budapest	10.1	16.7	44.1	≥ 60	9.8	27.7	44.3	12.2	19.3	26.8	37.8	8.3	11.9	19.1	13.8	21.3	18.8	27.6	7.4	6.9	11.0	15.1	23.0	14.7	22.4	6.8	4.9	7.8	16.6	24.9	11.1	18.0	6.1	3.4	5.4	
		Wien Prov.	10.3	16.9	53.7	≥ 60	9.6	34.5	55.2	12.7	20.0	28.8	40.2	8.0	12.5	20.0	14.5	22.2	19.6	28.6	7.1	6.9	11.1	15.7	23.7	15.4	23.4	6.5	4.9	7.9	17.2	25.6	12.2	19.4	5.9	3.6	5.7	
		Krefeld Prov.	10.8	17.6	47.9	≥ 60	9.2	29.3	46.8	12.9	20.2	29.6	41.2	7.9	12.9	20.6	13.7	21.3	21.9	31.7	7.4	8.3	13.3															
	e-van 2 small size	Copenhagen	8.1	14.2	≥ 60	≥ 60	11.5	44.7	71.4	12.2	19.4	26.9	37.8	8.3	11.9	19.1	14.6	22.4	19.8	28.8	7.0	6.9	11.1	16.4	24.6	16.1	24.2	6.2	4.9	7.8	18.3	27.0	13.0	20.4	5.5	3.5	5.6	
		Budapest	11.4	18.4	48.0	≥ 60	8.8	28.3	45.3	14.3	21.9	30.3	42.1	7.2	12.1	19.3	16.6	24.8	22.1	31.8	6.2	6.9	11.1	18.5	27.2	17.9	26.5	5.5	4.9	7.8	20.5	29.7	14.6	22.4	4.9	3.5	5.6	
		Wien Prov.	11.5	18.5	57.9	≥ 60	8.7	35.2	56.2	14.8	22.6	32.3	44.6	6.9	12.7	20.3	17.3	25.7	22.1	31.8	5.9	6.6	10.6	19.5	28.5	18.3	27.0	5.1	4.7	7.4	20.6	29.9	15.5	23.6	4.8	3.7	5.9	
		Krefeld Prov.	12.1	19.2	52.7	≥ 60	8.4	30.5	48.9	14.7	22.5	34.1	46.9	7.0	13.8	22.1																						
	e-van 3 large size	Copenhagen	6.7	12.4	61.0	≥ 60	13.1	45.0	72.0	9.3	15.7	22.3	32.1	10.4	11.9	19.0	10.8	17.5	15.4	23.3	9.3	7.0	11.1	11.9	18.9	11.7	18.7	8.5	4.9	7.9	13.1	20.5	8.7	15.0	7.8	3.6	5.7	
		Budapest	9.6	16.0	44.0	≥ 60	10.2	28.6	45.7	11.4	18.3	25.9	36.6	8.8	12.1	19.3	12.8	20.1	17.7	26.2	8.0	6.9	11.1	13.9	21.4	13.7	21.2	7.4	4.9	7.9	15.0	22.8	10.5	17.3	6.8	3.6	5.8	
		Wien Prov.	9.7	16.2	57.8	≥ 60	10.1	38.1	60.9	12.0	19.1	27.7	38.9	8.5	12.6	20.2	13.4	20.8	18.4	27.1	7.6	6.9	11.1	14.4	22.1	15.0	22.9	7.1	5.2	8.3								
		Krefeld Prov.	10.2	16.9	50.1	≥ 60	9.7	32.0	51.3	12.0	19.1	29.5	41.1	8.4	13.6	21.8																						
	e-van 4 mediu m size	Copenhagen	5.6	11.1	59.7	≥ 60	14.4	46.1	73.7	7.2	13.1	19.2	28.2	12.5	11.9	19.0	8.1	14.1	12.2	19.3	11.6	7.0	11.1	8.7	14.9	8.7	14.9	11.0	5.0	8.0	9.4	15.7	5.3	10.8	10.4	3.5	5.6	
		Budapest	8.2	14.4	41.5	≥ 60	11.4	29.1	46.6	9.3	15.7	22.7	32.6	10.4	12.0	19.3	10.1	16.7	14.5	22.2	9.8	6.9	11.1	10.6	17.3	10.5	17.2	9.4	5.0	8.0	11.1	18.0	7.4	13.4	9.0	3.7	5.9	
		Wien Prov.	8.7	14.9	52.5	≥ 60	11.0	36.5	58.5	9.9	16.4	25.2	35.7	9.9	13.1	20.9	10.6	17.3	15.0	22.9	9.4	6.9	11.0	11.2	18.0	11.9	18.9	9.0	5.3	8.4								
		Krefeld Prov.	9.1	15.4	44.4	≥ 60	10.6	29.8	47.7	10.1	16.7	26.8	37.8	9.8	13.9	22.3	10.5	17.2	17.7	26.4	9.5	8.3	13.3															

Capacity fade at 5 and 8 years and 100,000km and 160,000km Capacity reserve applied: 15% Vans With payload

Legend		
	Capacity fade above and equal 20%	
	Capacity fade above or equal to 10% and below 20%;	
	Capacity fade below 10%	

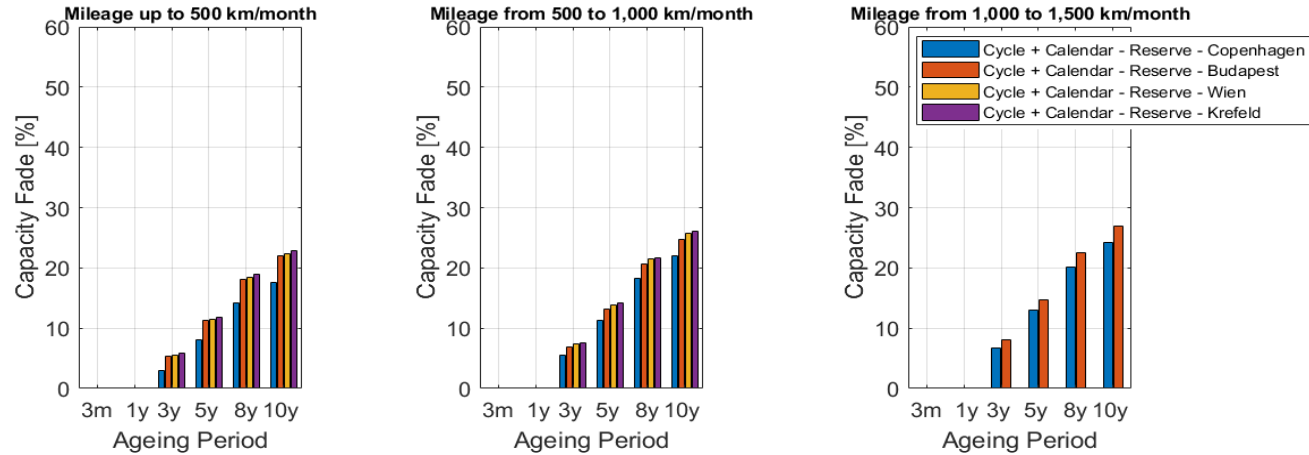
Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km Years Driving to Set Threshold Li-Ion NCM-LMO (2015)			0 - 500 km/month					500 – 1,000 km/month					1,000 -1,500 km/month					1,500 – 2,000 km/month					2,000+ km/month							
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km
Recharge Strategy #8	e-van 1 mediu m size	Copenhagen	7.3	13.1	44.9	≥ 60	12.4	34.0	54.5	9.3	15.6	21.6	31.2	10.5	11.5	18.4	10.1	16.6	14.8	22.6	9.8	7.1	11.3	10.6	17.3	10.8	17.5	9.4	5.1	8.1
		Budapest	10.1	16.7	39.7	≥ 60	9.8	23.9	38.3	11.3	18.1	29.2	40.7	8.9	14.3	22.8														
		Wien Prov. Krefeld Prov.	9.4	15.9	≥ 60	≥ 60	10.3	51.2	81.8	12.0	19.1	28.9	40.4	8.4	13.3	21.3														
	e-van 2 small size	Copenhagen	8.5	14.7	48.6	≥ 60	11.1	34.4	55.0	11.4	18.3	25.0	35.4	8.8	11.5	18.5	12.8	20.1	18.2	26.8	8.0	7.1	11.4	13.8	21.3	14.3	21.9	7.4	5.2	8.3
		Budapest	11.6	18.5	43.5	≥ 60	8.7	24.5	39.2	13.2	20.5	32.0	44.3	7.8	14.1	22.5														
		Wien Prov. Krefeld Prov.	10.4	17.1	≥ 60	≥ 60	9.5	51.2	81.8	13.9	21.4	36.4	50.0	7.4	16.0	25.6														
	e-van 3 large size	Copenhagen	6.8	12.6	44.2	≥ 60	12.9	34.4	55.1	8.4	14.5	20.4	29.7	11.3	11.6	18.5	8.9	15.2	13.6	21.1	10.8	7.2	11.5	9.2	15.6	9.8	16.2	10.5	5.2	8.3
		Budapest	9.6	16.0	39.2	≥ 60	10.2	24.5	39.2	10.3	16.9	27.3	38.3	9.6	14.1	22.5														
		Wien Prov. Krefeld Prov.	9.1	15.4	≥ 60	≥ 60	10.6	51.2	81.8																					
	e-van 4 mediu m size	Copenhagen	5.5	10.9	41.3	≥ 60	14.6	34.9	55.8	5.8	11.3	17.0	25.4	14.2	11.8	19.0	5.4	10.8	10.2	16.9	14.8	7.6	12.2							
		Budapest	8.0	14.1	38.9	≥ 60	11.6	27.3	43.7	8.2	14.3	25.8	36.6	11.4	15.6	24.9														
		Wien Prov. Krefeld Prov.	8.1	14.2	≥ 60	≥ 60	11.5	51.2	81.8																					
Recharge Strategy #17	e-van 1 mediu m size	Copenhagen	8.6	14.8	34.1	49.8	11.1	22.0	35.2	10.0	16.6	23.4	33.4	9.9	11.9	19.0	11.7	18.7	16.4	24.5	8.6	6.9	11.1	13.2	20.5	12.8	20.1	7.8	4.9	7.8
		Budapest	10.9	17.7	36.3	≥ 60	9.2	19.8	31.7	12.1	19.2	26.7	37.6	8.4	11.9	19.0	13.7	21.2	18.7	27.4	7.5	6.9	11.0	15.0	22.9	14.7	22.5	6.8	4.9	7.8
		Wien Prov. Krefeld Prov.	11.5	18.4	39.1	55.7	8.8	21.1	33.8	12.7	19.9	28.7	40.1	8.0	12.5	20.0	14.5	22.2	19.1	28.0	7.1	6.7	10.7	16.1	24.2	14.9	22.8	6.4	4.6	7.4
	e-van 2 small size	Copenhagen	10.2	16.7	37.5	54.3	9.7	22.1	35.4	12.1	19.2	26.9	37.8	8.4	12.1	19.3	14.5	22.2	19.6	28.5	7.1	6.9	11.0	16.5	24.7	16.0	24.1	6.2	4.8	7.7
		Budapest	12.5	19.8	39.8	≥ 60	8.1	20.0	32.1	14.1	21.8	30.5	42.3	7.2	12.3	19.6	16.4	24.6	22.0	31.6	6.2	7.0	11.2	18.1	26.8	18.2	26.8	5.6	5.0	8.0
		Wien Prov. Krefeld Prov.	13.1	20.5	42.5	≥ 60	7.8	21.2	33.9	14.7	22.5	32.2	44.5	7.0	12.7	20.4	16.9	25.2	23.1	33.1	6.0	7.2	11.5	20.0	29.1	17.9	26.6	5.0	4.4	7.1
	e-van 3 large size	Copenhagen	8.0	14.0	33.1	48.7	11.7	22.2	35.4	9.2	15.6	22.5	32.3	10.5	12.1	19.3	10.7	17.4	15.3	23.2	9.3	7.0	11.1	12.1	19.2	11.6	18.5	8.4	4.8	7.7
		Budapest	10.3	16.9	35.5	≥ 60	9.6	20.2	32.3	11.3	18.2	26.2	36.9	8.9	12.3	19.7	12.6	19.8	17.8	26.4	8.1	7.1	11.4	13.8	21.3	13.7	21.3	7.4	5.0	8.0
		Wien Prov. Krefeld Prov.	10.9	17.7	38.1	54.5	9.2	21.2	34.0	11.9	18.9	27.9	39.1	8.5	12.8	20.4	13.2	20.6	18.6	27.4	7.7	7.1	11.4	14.8	22.5	13.9	21.5	6.9	4.7	7.6
	e-van 4 mediu m size	Copenhagen	6.4	12.1	30.5	45.5	13.4	22.6	36.2	7.2	13.0	19.6	28.6	12.5	12.2	19.5	8.0	14.1	12.2	19.3	11.6	7.0	11.2	8.9	15.2	8.4	14.6	10.8	4.8	7.7
		Budapest	8.7	14.9	33.1	≥ 60	11.0	20.8	33.3	9.2	15.6	23.3	33.3	10.5	12.5	20.1	10.1	16.6	14.4	22.0	9.8	6.9	11.0	10.6	17.3	10.7	17.4	9.4	5.0	8.1
		Wien Prov. Krefeld Prov.	9.3	15.7	35.7	51.9	10.4	21.9	35.0	9.9	16.4	25.4	35.9	9.9	13.2	21.1	10.7	17.5	15.3	23.2	9.3	6.9	11.1	10.2	16.8	11.3	18.2	9.7	5.5	8.7

* Rech. Str. 17 SOC & trip length DC

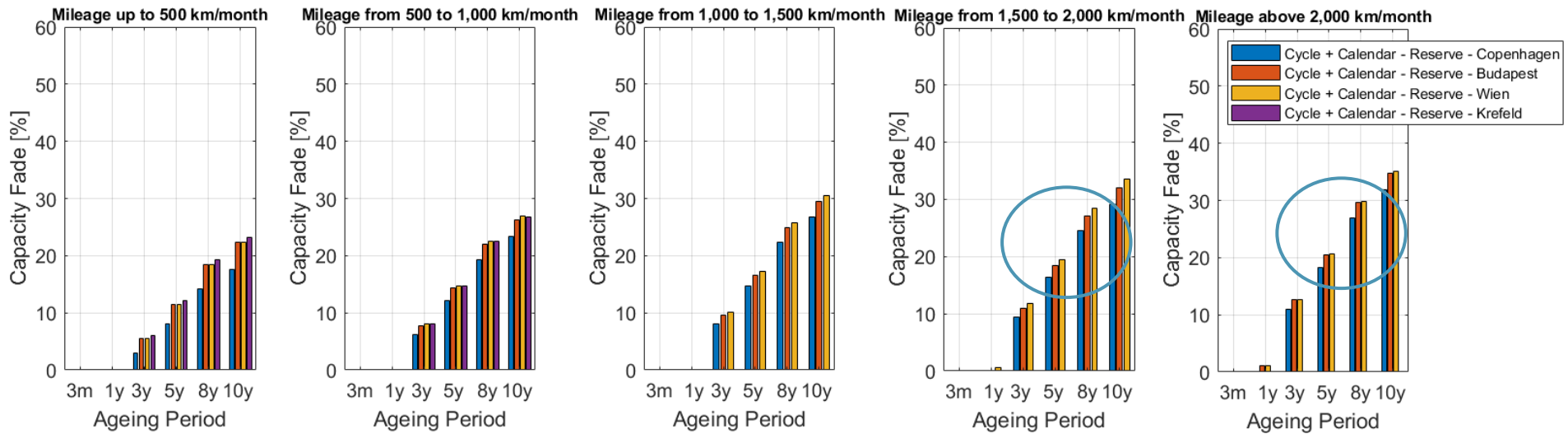
Capacity fade all cities – Van-2 Small-sized

With payload

Rech. Str. 6
AC random



Rech. Str. 7
DC random



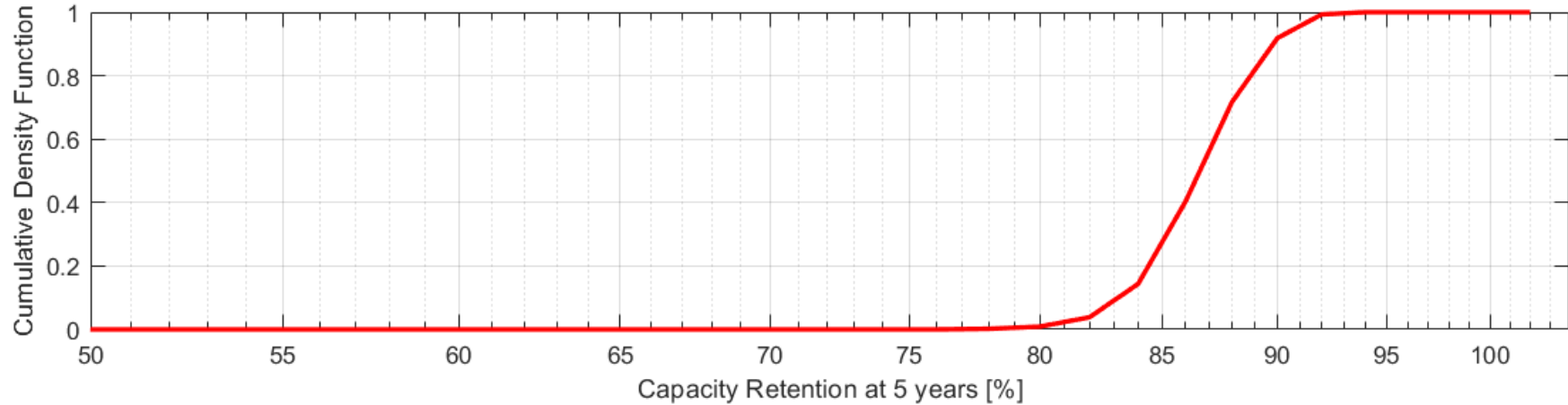
Li-Ion NCM-LMO (2015)
Wien province area

57th EVE IWG meeting
Brussels, 21st -22nd September, 2022

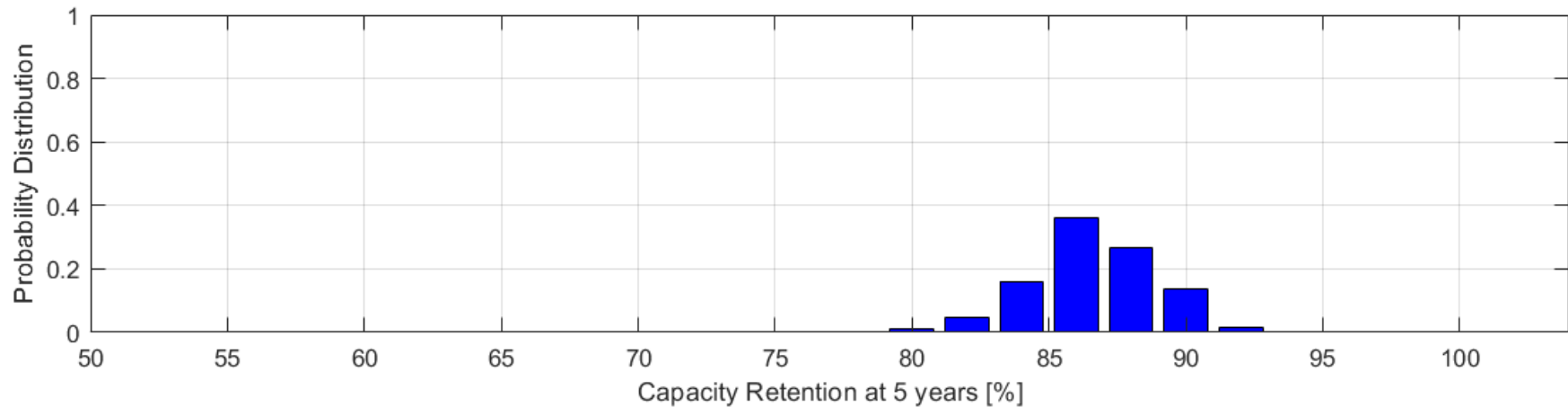
Capacity retention at 5 years – Van-2 Str.6 & Str.7

With payload

All km/month bins distributions



>75% ?

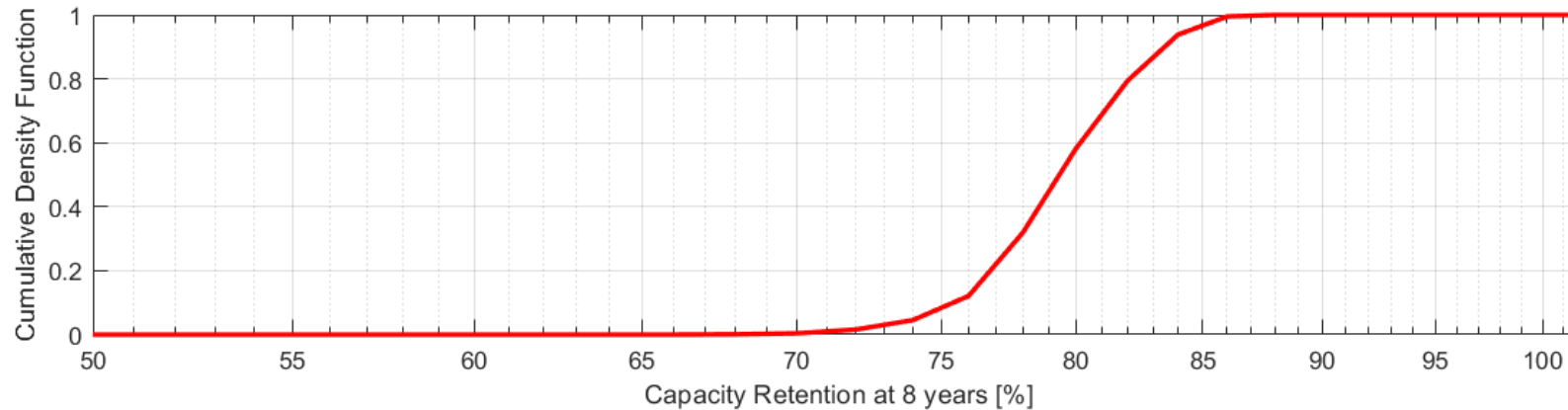


Li-Ion NCM-LMO (2015)
Wien province area

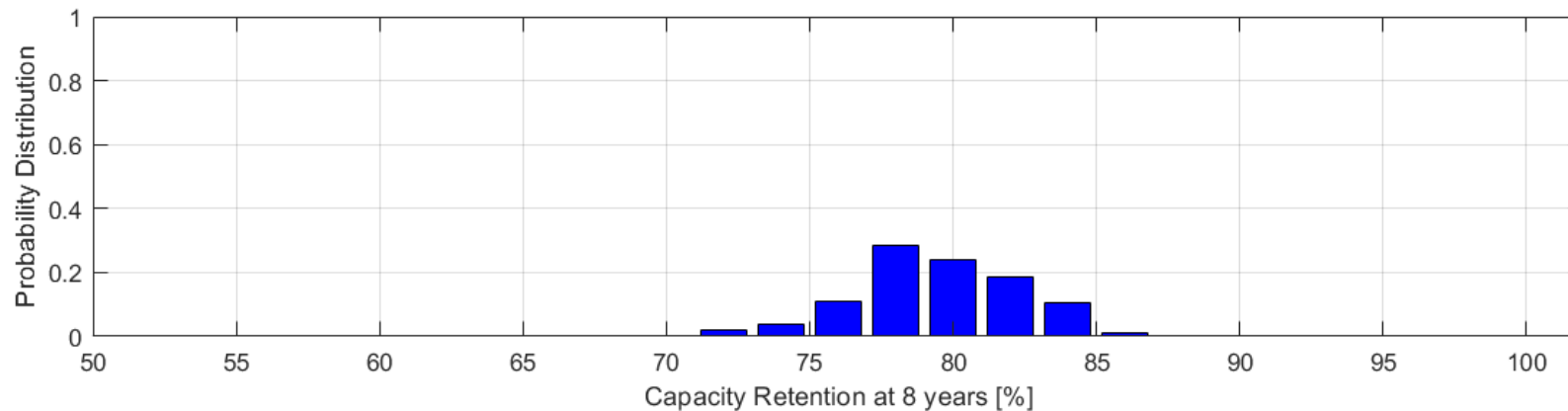
Capacity retention at 8 years – Van-2 Str.6 & Str.7

With payload

All km/month bins distributions



>65% ?

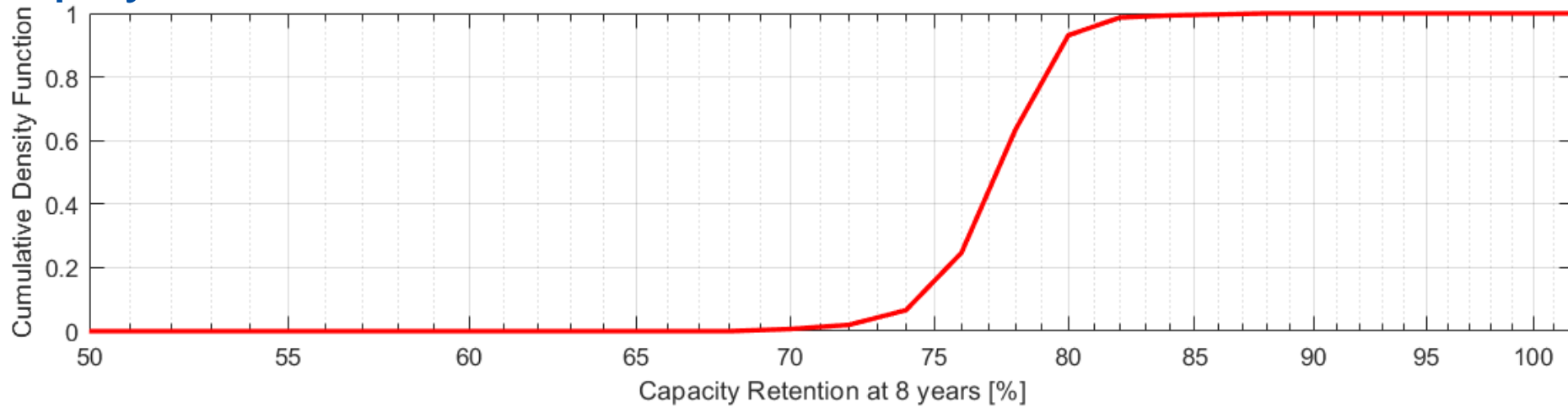


Li-Ion NCM-LMO (2015)
Wien province area

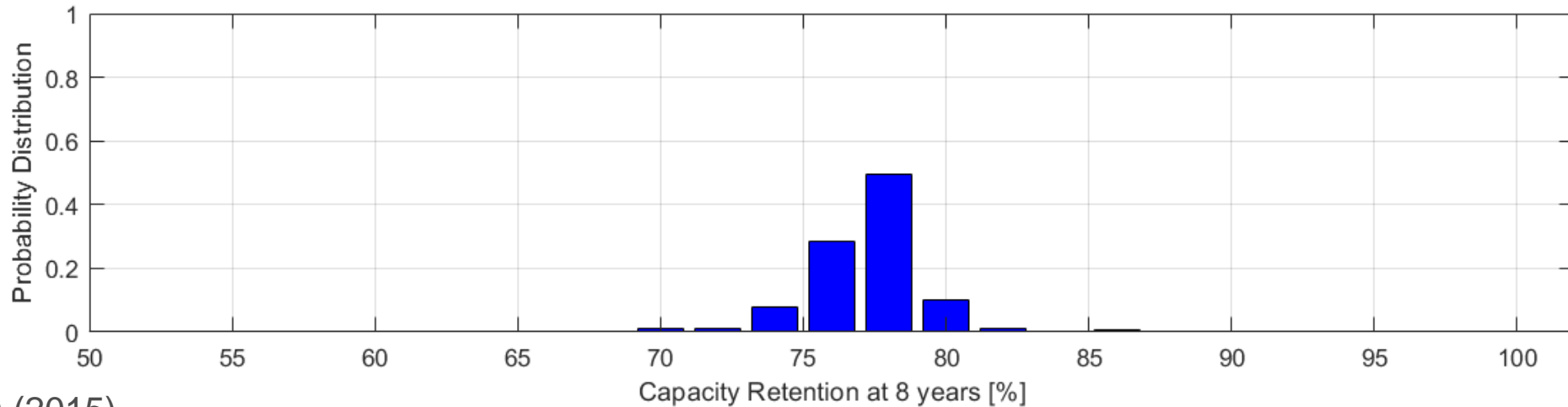
Capacity retention at 8 years – Van-2 Str.8 & Str.17

With payload

All km/month bins distributions



>65% ?



Li-Ion NCM-LMO (2015)
Wien province area

57th EVE IWG meeting
Brussels, 21st -22nd September, 2022

Discussion

➤ Initial option to start the discussion could be:

- e-Vans: > 75% of certified capacity within 5 years or 100,000 km
> 65% of certified capacity within 8 years or 160,000 km

➤ Follow up

- Warranties data ?
- Set of available data in literature, if any ?
- Additional analysis increasing further the energy consumption when considering payload ?
- ...

Thank you for the attention

Q&A

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Capacity fade at 5 and 8 years and 100,000km and 160,000km

Capacity reserve applied: 15% Vans

With payload

Legend	
	Capacity fade above and equal 20%
	Capacity fade above or equal to 10% and below 20%;
	Capacity fade below 10%

Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km Years Driving to Set Threshold Li-Ion NCM-LMO (2015)			0 - 500 km/month					500 – 1,000 km/month					1,000 -1,500 km/month					1,500 – 2,000 km/month					2,000+ km/month														
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km							
Recharge Strategy #18	e-van 1 medium size	Copenhagen	7.3	13.1	50.7	≥60	12.4	38.2	61.1	9.9	16.4	23.9	34.0	10.0	12.3	19.7	11.5	18.5	16.8	25.1	8.8	7.2	11.6	12.7	20.0	13.2	20.5	8.0	5.2	8.3							
		Budapest	10.0	16.6	45.0	≥60	9.8	28.6	45.7	12.0	19.1	27.4	38.5	8.4	12.4	19.9	13.6	21.1	18.7	27.5	7.5	7.0	11.1	14.8	22.6	14.7	22.4	6.9	4.9	7.9							
		Wien Prov. Krefeld Prov.	10.2 10.9	16.8 17.7	56.0 46.2	≥60 ≥60	9.7 9.2	36.2 27.8	57.9 44.4	12.6 12.7	19.8 20.0	29.2 30.1	40.8 41.9	8.1 8.0	12.9 13.3	20.7 21.4	14.5 14.5	22.2 22.2	18.7 18.7	27.5 27.5	7.1 7.1	6.6 6.6	10.5 10.5														
	e-van 2 small size	Copenhagen	8.4	14.5	56.5	≥60	11.3	39.8	63.7	12.0	19.0	27.3	38.3	8.5	12.4	19.8	14.3	21.9	20.0	29.1	7.2	7.2	11.5	15.7	23.7	16.8	25.1	6.5	5.4	8.6							
		Budapest	11.4	18.3	48.7	≥60	8.9	29.0	46.4	14.0	21.6	31.1	43.1	7.3	12.7	20.3	16.3	24.5	22.2	31.9	6.3	7.1	11.3	18.1	26.8	18.0	26.6	5.6	5.0	7.9							
		Wien Prov. Krefeld Prov.	11.2 12.3	18.1 19.5	≥60 49.4	≥60 ≥60	8.9 8.2	29.2 27.8	62.7 44.4	14.5 14.9	22.2 22.2	32.7 31.8	45.2 44.0	7.1 6.9	13.2 12.4	21.1 19.8	17.6 17.6	26.1 26.1	21.2 21.2	30.6 30.6	5.8 5.8	6.2 6.2	9.9 9.9														
	e-van 3 large size	Copenhagen	6.8	12.6	52.4	≥60	12.9	40.1	64.1	9.1	15.4	22.9	32.8	10.6	12.4	19.9	10.6	17.2	15.6	23.6	9.5	7.2	11.5	13.7	21.3	13.7	21.2	7.4	5.0	8.0							
		Budapest	9.5	15.9	44.7	≥60	10.3	29.3	46.9	11.2	18.1	26.7	37.5	9.0	12.7	20.3	12.5	19.7	18.1	26.7	8.1	7.2	11.6	13.7	21.3	13.7	21.2	7.4	5.0	8.0							
		Wien Prov. Krefeld Prov.	9.7 10.4	16.2 17.1	59.6 45.1	≥60 ≥60	10.1 9.5	39.2 27.8	62.7 44.4	11.7 12.0	18.7 19.1	28.7 27.4	40.1 38.5	8.6 8.4	13.5 12.4	21.6 19.8	13.6 13.6	21.1 21.1	16.8 16.8	25.1 25.1	7.5 7.5	6.2 6.2	9.9 9.9														
	e-van 4 medium size	Copenhagen	5.7	11.2	50.9	≥60	14.3	41.2	65.9	7.1	12.9	20.1	29.3	12.7	12.7	20.3	8.0	14.1	12.5	19.7	11.6	7.1	11.4	10.6	17.3	11.2	18.0	9.4	5.2	8.4							
		Budapest	8.2	14.3	42.9	≥60	11.5	30.5	48.8	9.2	15.6	23.4	33.5	10.5	12.7	20.3	9.9	16.5	14.9	22.8	9.9	7.2	11.5	10.6	17.3	11.2	18.0	9.4	5.2	8.4							
		Wien Prov. Krefeld Prov.	8.5 9.1	14.8 15.5	59.5 42.8	≥60 ≥60	11.1 10.6	40.9 28.4	65.5 45.5	9.6 10.4	16.1 17.1	24.7 20.6	35.1 30.1	10.1 9.5	13.0 9.9	20.8 15.8	10.6 10.6	17.3 17.3	14.6 14.6	22.3 22.3	9.4 9.4	6.7 6.7	10.7 10.7														
Recharge Strategy #19	e-van 1 medium size	Copenhagen	7.4	13.2	48.9	≥60	12.3	36.8	58.9	10.1	16.7	22.9	32.8	9.8	11.5	18.4	11.7	18.6	16.5	24.7	8.7	7.0	11.2	12.9	20.1	13.0	20.3	7.9	5.0	8.1	14.1	21.7	9.9	16.5	7.3	3.7	5.9
		Budapest	10.0	16.6	44.4	≥60	9.8	28.0	44.9	11.9	19.0	27.5	38.5	8.5	12.5	20.0	13.5	21.0	18.6	27.4	7.6	7.0	11.2	14.7	22.4	14.5	22.2	7.0	4.9	7.9							
		Wien Prov. Krefeld Prov.	10.1 10.7	16.7 17.5	57.3 48.8	≥60 ≥60	9.7 9.3	37.1 30.2	59.3 48.3	12.6 12.7	19.8 20.0	29.2 30.1	40.8 41.8	8.1 8.0	13.0 13.3	20.7 21.3	14.4 14.4	22.0 22.0	18.6 18.6	27.4 27.4	7.1 7.1	6.6 6.6	10.5 10.5														
	e-van 2 small size	Copenhagen	8.5	14.7	52.9	≥60	11.1	37.4	59.8	12.3	19.4	26.2	37.0	8.3	11.5	18.4	14.4	22.1	19.9	28.9	7.1	7.1	11.3	16.1	24.1	16.4	24.6	6.4	5.1	8.2	17.9	26.4	13.2	20.7	5.7	3.7	5.9
		Budapest	11.4	18.3	48.2	≥60	8.8	28.6	45.7	14.0	21.6	31.1	43.0	7.3	12.7	20.4	16.2	24.4	22.1	31.8	6.3	7.1	11.3	18.0	26.6	17.9	26.4	5.6	5.0	7.9							
		Wien Prov. Krefeld Prov.	11.1 12.0	18.0 19.1	65.6 52.0	≥60 ≥60	9.0 8.4	40.1 30.2	64.1 48.3	14.4 14.9	22.1 22.7	33.0 32.0	45.5 44.3	7.1 6.9	13.4 12.5	21.4 20.0	17.5 17.5	26.0 26.0	21.1 21.1	30.5 30.5	5.8 5.8	6.2 6.2	9.9 9.9														
	e-van 3 large size	Copenhagen	6.9	12.7	48.6	≥60	12.8	37.4	59.9	9.3	15.7	21.8	31.4	10.4	11.5	18.4	10.6	17.3	15.5	23.4	9.4	7.1	11.3	11.6	18.6	11.9	19.0	8.7	5.1	8.2	12.7	19.9	8.7	15.0	8.0	3.7	5.9
		Budapest	9.5	16.0	44.1	≥60	10.2	28.8	46.0	11.2	18.0	26.5	37.4	9.0	12.7	20.3	12.4	19.6	18.0	26.6	8.2	7.2	11.6	13.6	21.1	13.6	21.1	7.5	5.0	8.0							
		Wien Prov. Krefeld Prov.	9.6 10.2	16.1 16.9	≥60 47.7	≥60 ≥60	10.1 9.6	40.1 30.2	64.1 48.3	11.6 12.0	18.6 19.1	28.7 27.6	40.1 38.8	8.7 8.4	13.5 12.5	21.6 20.0	13.5 13.5	20.9 20.9	16.7 16.7	24.9 24.9	7.6 7.6	6.2 6.2	9.9 9.9														
	e-van 4 medium size	Copenhagen	5.8	11.3	46.2	≥60	14.2	38.0	60.8	7.2	13.0	18.8	27.7	12.5	11.7	18.7	7.8	13.8	12.6	19.8	11.9	7.3	11.7	8.5	14.7	8.7	14.9	11.2	5.1	8.2							
		Budapest	8.1	14.3	42.4	≥60	11.5	30.1	48.1	9.1	15.5	23.4	33.5	10.6	12.7	20.4	9.8	16.3	14.8	22.6	10.0	7.2	11.6	10.4	17.1	11.0	17.8	9.5	5.2	8.4							
		Wien Prov. Krefeld Prov.	8.5 9.0	14.7 15.3	≥60 45.6	≥60 ≥60	11.1 10.7	41.8 31.0	66.9 49.6	9.6 10.3	16.1 17.0	24.6 20.5	35.0 29.9	10.2 9.6	13.0 9.9	20.8 15.8	10.5 10.5	17.2 17.2	14.4 14.4	22.1 22.1	9.5 9.5	6.7 6.7	10.7 10.7														

* Rech. Str. 18 lunch break DC

**Rech. Str. 19 lunch break DC and Night-charging AC



Capacity fade at 5 and 8 years and 100,000km and 160,000km

Capacity reserve applied: 15% Vans

With payload

Legend	
	Capacity fade above and equal 20%
	Capacity fade above or equal to 10% and below 20%;
	Capacity fade below 10%

Capacity fade in [%] at 5 years and 100,000km at 8 years and 160,000km Years Driving to Set Threshold Li-Ion NCM-LMO (2015)			0 - 500 km/month					500 – 1,000 km/month					1,000 -1,500 km/month					1,500 – 2,000 km/month					2,000+ km/month														
			5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km	5 years %	8 years %	100,000 km %	160,000 km %	Years to EoL	Years to 100,000 km	Years to 160,000 km							
Recharge Strategy #16	e-van 1 medium size	Copenhagen	6.9	12.7	≥ 60	≥ 60	12.8	73.3	117.2	9.2	15.5	21.5	31.1	10.6	11.5	18.4	10.1	16.6	14.2	21.8	9.8	6.8	10.9	10.5	17.2	10.1	16.7	9.5	4.9	7.8	10.8	17.5	6.9	12.7	9.3	3.6	5.8
		Budapest	9.8	16.3	50.6	≥ 60	10.0	33.3	53.2	11.3	18.1	24.9	35.4	8.9	11.6	18.6	11.8	18.8	16.2	24.4	8.6	6.8	10.9	12.1	19.1	11.6	18.6	8.4	4.8	7.7	12.0	19.0	7.7	13.7	8.5	3.6	5.7
		Wien Prov.	10.1	16.7	≥ 60	≥ 60	9.8	61.1	97.7	12.0	19.1	26.7	37.6	8.4	12.0	19.2	12.5	19.6	16.7	25.0	8.2	6.7	10.7	12.5	19.7	12.1	19.1	8.2	4.8	7.8	12.6	19.8	8.0	14.1	8.1	3.5	5.5
	e-van 2 small size	Copenhagen	8.0	14.0	≥ 60	≥ 60	11.7	80.1	128.2	11.4	18.3	24.8	35.2	8.8	11.5	18.3	12.9	20.2	17.7	26.2	7.9	6.9	11.0	13.9	21.4	13.5	20.9	7.4	4.9	7.8	14.6	22.2	10.5	17.3	7.1	3.7	6.0
		Budapest	11.1	17.9	59.0	≥ 60	9.0	36.6	58.6	13.4	20.9	28.2	39.4	7.6	11.6	18.6	14.7	22.5	19.6	28.6	7.0	6.8	10.9	15.5	23.4	15.1	22.9	6.6	4.9	7.8	15.9	23.9	11.1	18.0	6.4	3.6	5.7
		Wien Prov.	11.1	18.0	≥ 60	≥ 60	9.0	65.8	105.3	14.1	21.7	30.1	41.9	7.3	12.1	19.4	15.3	23.2	19.7	28.7	6.7	6.6	10.5	16.0	24.0	15.7	23.7	6.4	4.9	7.9	17.4	25.8	11.8	18.8	5.8	3.4	5.4
	e-van 3 large size	Copenhagen	6.5	12.2	≥ 60	≥ 60	13.3	81.0	129.7	8.3	14.4	20.1	29.3	11.4	11.4	18.3	8.9	15.1	13.0	20.3	10.8	6.9	11.0	9.1	15.4	8.8	15.0	10.7	4.9	7.8	9.0	15.2	5.7	11.2	10.8	3.7	6.0
		Budapest	9.2	15.6	54.8	≥ 60	10.5	37.2	59.5	10.3	17.0	23.6	33.7	9.6	11.7	18.7	10.6	17.3	14.9	22.6	9.4	6.8	10.9	10.6	17.3	10.3	16.9	9.4	4.9	7.8	10.1	16.7	6.4	12.0	9.8	3.6	5.8
		Wien Prov.	9.6	16.0	≥ 60	≥ 60	10.2	66.4	106.2	11.1	18.0	25.6	36.2	9.0	12.2	19.5	11.1	18.0	14.9	22.7	9.0	6.6	10.5	11.2	18.0	11.1	17.9	9.0	5.0	8.0							
	e-van 4 medium size	Copenhagen	5.4	10.8	≥ 60	≥ 60	14.7	85.6	136.9	5.6	11.1	16.1	24.3	14.5	11.4	18.2	5.2	10.5	8.8	15.0	15.2	6.9	11.1	4.2	9.2	4.1	9.1	16.8	4.9	7.9	≤ 5	6.8	≤ 5	≤ 5	20.9	3.6	5.8
		Budapest	7.8	13.8	55.0	≥ 60	11.8	39.8	63.6	7.6	13.6	19.5	28.5	12.0	11.7	18.7	6.7	12.4	10.3	16.9	13.1	6.8	10.9	5.7	11.1	5.7	11.1	14.5	5.0	8.0	≤ 5	8.5	≤ 5	5.4	17.9	3.8	6.0
		Wien Prov.	8.4	14.6	≥ 60	≥ 60	11.2	69.2	110.7	8.5	14.7	21.6	31.2	11.1	12.2	19.5	7.2	13.0	10.2	16.8	12.6	6.5	10.4	6.1	11.6	5.9	11.4	13.9	4.9	7.8							
Recharge Strategy #116	e-van 1 medium size	Copenhagen	7.5	13.4	40.7	≥ 60	12.2	30.2	48.3	9.2	15.6	21.4	31.0	10.5	11.4	18.2	10.1	16.6	14.6	22.2	9.8	7.0	11.1	10.6	17.3	10.5	17.1	9.4	4.9	7.9	11.0	17.7	8.2	14.4	9.2	4.0	6.4
		Budapest	9.7	16.2	43.1	≥ 60	10.1	27.5	44.1	11.3	18.1	25.0	35.4	8.9	11.7	18.7	11.8	18.8	16.3	24.5	8.6	6.8	10.9	12.0	19.0	11.9	18.9	8.5	5.0	7.9	11.7	18.7	8.2	14.3	8.6	3.8	6.0
		Wien Prov.	10.2	16.8	50.2	≥ 60	9.7	32.2	51.6	12.0	19.1	26.6	37.5	8.4	12.0	19.2	12.5	19.6	16.7	24.9	8.2	6.6	10.6	12.7	19.9	12.3	19.4	8.0	4.9	7.8							
	e-van 2 small size	Copenhagen	8.8	15.1	44.2	≥ 60	10.9	30.4	48.6	11.5	18.4	24.8	35.2	8.8	11.5	18.3	12.9	20.1	18.0	26.6	7.9	7.0	11.2	13.9	21.4	14.1	21.6	7.4	5.1	8.1							
		Budapest	11.2	18.0	46.5	≥ 60	9.0	27.7	44.3	13.4	20.8	28.3	39.6	7.6	11.7	18.8	14.7	22.4	19.7	28.8	7.0	6.9	11.0	15.2	23.0	15.6	23.5	6.8	5.1	8.2	14.6	22.3	11.0	17.9	7.0	3.9	6.2
		Wien Prov.	11.4	18.3	55.1	≥ 60	8.8	33.6	53.7	14.0	21.6	30.3	42.1	7.3	12.3	19.7	15.3	23.2	19.6	28.6	6.7	6.5	10.4	16.2	24.3	15.9	23.9	6.3	4.9	7.8							
	e-van 3 large size	Copenhagen	7.0	12.8	39.8	≥ 60	12.7	30.4	48.7	8.4	14.5	20.3	29.5	11.3	11.5	18.3	8.9	15.2	13.4	20.8	10.8	7.0	11.3	9.2	15.5	9.4	15.8	10.5	5.1	8.1							
		Budapest	9.2	15.6	42.2	≥ 60	10.5	27.7	44.4	10.3	17.0	23.7	33.8	9.6	11.7	18.8	10.6	17.3	15.1	23.0	9.4	6.9	11.1	10.6	17.2	10.9	17.7	9.4	5.1	8.2	8.7	14.9	5.8	11.3	11.0	3.8	6.1
		Wien Prov.	9.7	16.2	50.7	≥ 60	10.1	33.6	53.7	11.1	17.9	25.8	36.4	9.1	12.3	19.7	11.2	18.1	15.1	22.9	9.0	6.6	10.5	11.3	18.2	11.3	18.2	8.9	5.0	8.0							
	e-van 4 medium size	Copenhagen	10.0	16.6	46.2	≥ 60	9.8	29.4	47.1	11.4	18.3	27.1	38.1	8.9	12.8	20.5	11.6	18.5	18.9	27.9	8.7	8.2	13.1	12.2	19.3	11.7	18.8	8.3	4.8	7.7							
		Budapest	5.6	11.0	36.6	≥ 60	14.6	30.7	49.1	5.8	11.2	16.5	24.8	14.3	11.6	18.5	5.4	10.7	9.4	15.8	14.9	7.2	11.5	4.8	10.0	5.5	10.8	15.8	5.3	8.5							
		Wien Prov.	8.3	14.5	47.5	≥ 60	11.3	33.8	54.0	8.5	14.7	22.1	31.8	11.2	12.5	20.0	7.4	13.3	10.7	17.4	12.3	6.6	10.5	6.1	11.6	6.8	12.4	13.9	5.3	8.5							
e-van 4 medium size	Copenhagen	8.6	14.8	43.9	≥ 60	11.0	30.3	48.5	8.9	15.2	23.1	33.1	10.8	12.8	20.5	8.1	14.2	14.6	22.4	11.5	8.2	13.1															

* Rech. Str. 16 Each return home/depot AC

**Rech. Str. 116 Last return home/depot of the day AC

